FEBRUARY 1, 1960

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

Money Hassle Muddies Outlook for Road Building

Spending for highway construction will total $5.7 billion this year, says the Commerce Department. That should bring $2 billion sales to the construction equipment industry. Financing is still a major obstacle to long range road building plans. No help is seen from Congress in this election year, but highway officials pin their hopes on 1961. See Page 41.

Molecular Electronics: New Concept Challenges Conventional Circuitry

Tool Builder Initiates New Lease Plan

Get the Most Out of Your Trade Show

Extruded Aluminum for Missile Skin Simplifies Airframe Assembly

Tips for Better Abrasives Use

Metal Inventories Improving Rapidly

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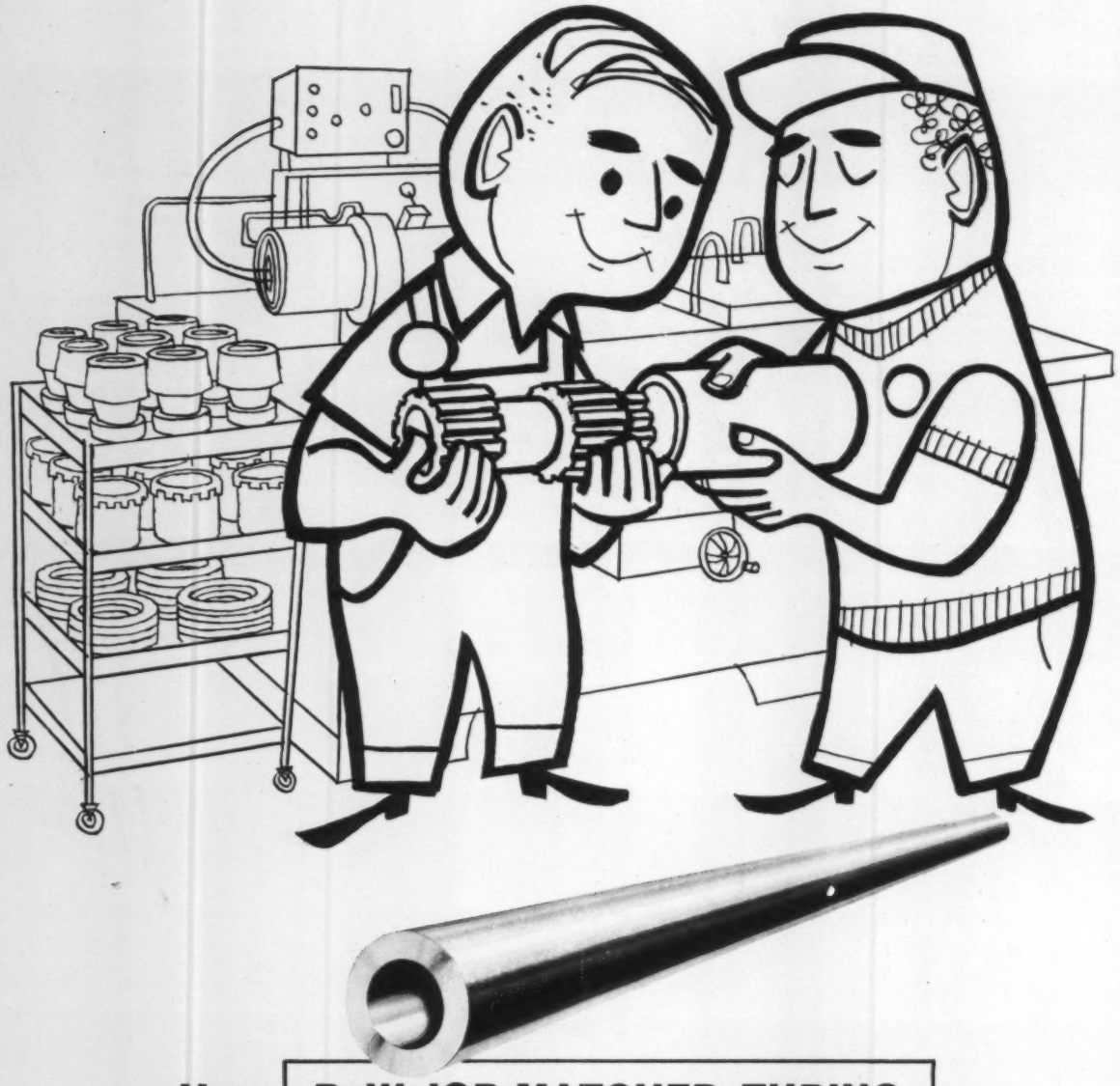

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You can get the right tube for your job with B&W Seamless Mechanical Tubing because you can choose from:

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These are just some of the reasons it pays to specify B&W Job-Matched Mechanical Tubing. Call your local B&W District Sales Specialist, or write for Bulletin TB-361 for full information. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

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This Week in STEEL

The Metalworking Weekly

February 1, 1960 Vol. 146 No. 5

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Index available semiannually.

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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1960 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Metalworking Pulse ▶

TURN

Metalworking Pulse

INDUSTRIAL PRODUCTION INDEX

	WEEK ENDED JAN. 23	PREVIOUS WEEK	MONTH AGO	YEAR AGO
(1947-49=100) Based on steel output, electric power output, freight carloadings, auto assemblies	184†	184	164	157

†Preliminary.

For the second consecutive week, STEEL's industrial production index maintained the all-time high of 184 (1947-49=100). Steel and auto production are keeping the level up while electricity production and railroad freight carloadings give way to seasonal dips.

Details on Page 61

U. S. PASSENGER CAR PRODUCTION

	WEEK ENDED JAN. 30	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Number of units assembled ..... (Source: Ward's Automotive Reports.)	175,000*	176,265†	112,113	119,678

*Estimated. †Preliminary.

At about 175,000 cars and 30,000 trucks, motordom has just about reached its maximum effort for this quarter. Some observers feel the industry is overscheduled in view of relatively soft sales. Look for some adjustments in coming weeks.

Details on Page 57

NATIONAL STEEL INGOT PRODUCTION

	WEEK ENDED JAN. 31	PREVIOUS WEEK	MONTH AGO	YEAR AGO
Net tons (thousands)	2,721*	2,727	2,726	2,178
Index (1947-49=100)	169.4*	169.8	169.7	135.6
Percentage of capacity	95.5*	95.7	96.3	76.9

*Estimated by STEEL; comparative figures reported by AISI.

Production of ingots and steel for castings rose to an all-time high in January. Some 12 million tons flowed from furnaces as the industry strove to meet industry's pentup demand.

Details on Page 120

STEEL SCRAP PRICE COMPOSITE

	JAN. 27	WEEK AGO	MONTH AGO	YEAR AGO
Based on No. 1 heavy melting grade at Pittsburgh, Chicago, & eastern Pennsylvania.	$42.33	$42.33	$41.33	$41.67

Composite price on No. 1 heavy melting holds unchanged in a firm to strong market. Slack domestic demand is offset by active buying for export. The next price movement is expected to be upward.

Details on Page 133

FINISHED STEEL PRICE INDEX

	JAN. 26	WEEK AGO	MONTH AGO	YEAR AGO
Based on Bureau of Labor Statistics data (1947-49=100)	186.8	186.8	186.8	187.0

The only price revisions in finished steel are appearing in schedules issued by service centers. Following cuts in St. Louis on certain hot rolled products, a $1 reduction was posted in the Pittsburgh area through an adjustment of quantity differentials.

Details on Page 121

Bridge over Appomattox River between Colonial Heights and Petersburg.

Dual bridge over Jackson River, near Covington, Va.

Girders fabricated from steel plate for Virginia highway bridges

Four-lane turnpike over Atlantic Coast Line's tracks in Dinwiddie County.

These three new bridges on the Richmond-Petersburg Turnpike in Virginia illustrate the important part steel plate plays in modern highway building. For strength, long-life, and economy, plate-girder construction is ideal for spans over rivers, railroads, and highways.

In fact Bethlehem plates are ideal for any type of fabrication, particularly where welding may be involved. By using Bethlehem plate, plus proper welding technique, you get sound welds every time.

Bethlehem plates come in a full range of sheared and universal mill sizes.

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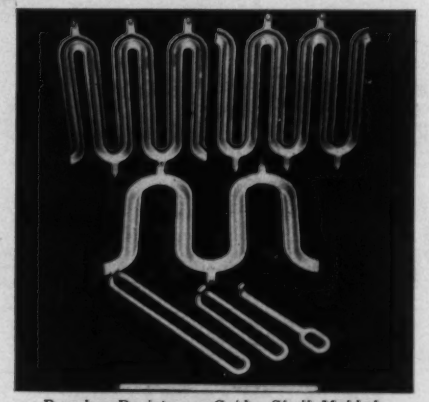
Duraloy Centrifugally Cast Tubes 7'9" long, 7" O.D., ⅜" wall. 28 Cr 10 Ni; some of HOM alloy.



Duraloy Resistance Grids—Shell Molded. 18 Cr 38 Ni; some of special HOM alloy.

Heat treating furnaces need high alloy castings... radiant heat tubes for gas or oil fired... resistance grids for electrical... and castings for handling material through the furnace. *And the castings must be fail-proof!*

One reason—indeed the major reason—why The Electric Furnace Company, Salem, Ohio, has leaned so heavily on Duraloy for its castings is that over the years Duraloy Castings have established a fine record for durability and uniformity. And with the recent development of Duraloy HOM, the furnace company can work towards higher temperature operations. HOM can be used quite broadly at temperatures up to 2200°F and in a limited way to 2300°F. It can be cast statically, centrifugally and shell molded.

When such an authority on heat treating furnaces as Electric Furnace so consistently selects Duraloy castings for these furnaces on which it has built an enviable reputation... that preference suggests quite strongly that Duraloy castings are consistently sound and skillfully alloyed to meet exacting high temperature applications. This same skill offers comparable values to all who require high alloy castings.

Annealing furnace designed and constructed by The Electric Furnace Company used for cycle annealing of enameling iron strip and bright annealing of cold rolled strip. Three methods of heating: direct fuel fire; fuel fired radiant heat; and electric resistance used in the various zones.

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For fast delivery, COMMERCIAL offers heads from stock made with a complete range of solid dies in all standard sizes from 12" to 72" O.D. . . . in all popular gauges up to ½" thickness. Heads can be furnished for code or non-code pressure vessel construction from steels to meet the required specifications. Types furnished include flanged-and-dished, ellipsoidal, hemispherical, flanged only, double dished and obround.

With over 30 years experience and ingenuity in cold forming of steel, COMMERCIAL produces heads with improved metal quality in presses up to 2000-ton capacity. Three plants—Youngstown, Chicago, Salt Lake City—strategically located in important steel producing centers, are keyed to expedite your order.

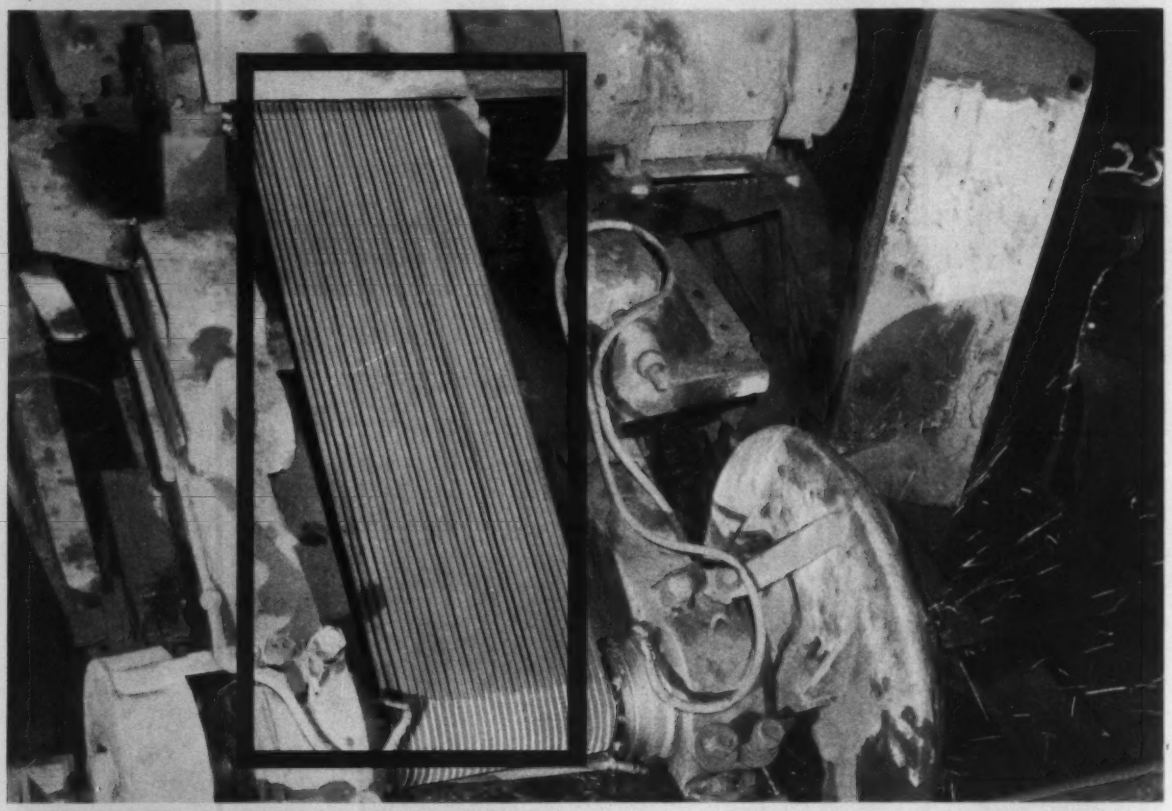
For full information on heads in stock for immediate delivery, write to Commercial Shearing & Stamping Company, Dept. L-6, Youngstown 1, Ohio.

Specialists in the shape of things to come

COMMERCIAL shearing & stamping

Chewing through a steady diet of red-hot, 8-inch steel bars proved too much for the biggest saw at this Western mill. It looked like the V-belt drive would have to be upped by at least 100 h.p. —with costly new sheaves installed to handle the extra load. But the G.T.M.—Goodyear Technical Man—made a suggestion: COMPASS-V-Steel Belts. Today, a matched set of only 28 of his high-capacity belts handle a job that normally calls for 42 belts. Yet there's been no sacrifice in belt-life—no costly sheave replacement. Result: the mill owners saved $500 when they re-powered the saw—will continue to save every time belts are changed.

Compass—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio



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COMPASS-V-Steel Belts for Hot Saw Drive
A Load-carrying section of endless high-tensile steel cable
B Notches open between pulleys, dissipating heat
C Notches compress rounding pulleys, giving continuous gripping surface
D Highest-quality rubber underbody
E Sturdy bias-laid fabric cover resists wear

Grueling service requirements like this are just routine to the G.T.M. Invariably, he has tips — and industrial rubber products — for improving production.

You can always reach him quickly and easily, too. Just contact your Goodyear Distributor—also the man to see for V-Belts, Hose, Flat Belts and other industrial items. He's under "Rubber Goods" or "Rubber Products" in the Yellow Pages. Or write Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

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Apr. 1, 1960

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HERE'S HOW YOU CAN WIN

$1000 This Month

IN STEEL'S

Usership Idea of the Month Contest

Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—February, 1960) to help you accomplish an important personal or company objective.

Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—

YOU WILL WIN $500

There's more . . . you will win an additional $500 if you submit written proof that you were successful in accomplishing your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

Entries will be judged by a committee of STEEL editors. All letters become the property of STEEL Magazine.

A Few Notes on the Contest

In the above announcement, the bag of coins is only symbolic. We wanted to show dollar bills fanned around the cartoon, but Uncle Sam's Sercret Service people nixed the idea. We asked about photographing silver dollars, or other nonferrous coins, and the O.K. was given. So don't fret about the award's weight. If you enter and win, you can collect the award in conveniently folded currency or a check.

Just so you know everything is on the up and up, employees of The Penton Publishing Co. are not eligible to enter the contest.

Little Known Facts Dept.

The tin can celebrates its one hundred fiftieth birthday this year. The "canister" was patented in England in 1810.

American Can Co. says more than 800 billion cans have been made in the U. S. alone. Stacked end to end, they would stretch beyond the planet Mercury—50 million miles from Earth. Americans open 42 billion cans a year—940 per family. More then 600 different sizes, shapes, and styles are made in the U. S. They contain some 2200 different items, ranging all the way from ants (chocolate covered) to zucchini.

We Dote on Usership

George Gorton III, president of the Racine, Wis., machine company that bears his name, wrote to us about our Jan. 11 capital equipment report. He says: "We think these reports are excellent. We find them helpful and you may count on our co-operation in future surveys of this type."

The Cobbler and His Last

We quote from *Time* magazine's Jan. 18 review of *Collected Essays* by Allen Tate: ". . . Author Tate . . . has long been associated with a group of southern 'agrarians' who have persistently preached a flight from the machine age to the rural virtue of the soil. Tate's own 30 year war against the corrosion of civilization by the machine has been fought in the pages of literary quarterlies which, he observes wryly, serve the purpose 'of acquainting unpopular writers with one another's writing.' They are, specifically, the

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trade journals of literature, just as . . . STEEL (is one of) the trade journals of the metalworking industries. Where STEEL ponders the notch sensitivity of beryllium or discusses the control of stress corrosion cracking by shot peening, the literary mandarins in the *Kenyon Review* proclaim the 'procedure of positivism' that 'reduces the aesthetic sign to a *denotatum*.'

"The vocabularies in all trade journals sound abstruse and incomprehensible to laymen. . ."

We thought you'd like to know. We're going to phone the people at Kenyon College. We'll gladly swap information on the control of stress corrosion cracking if they'll tell us how the procedure of positivism reduces the aesthetic sign to a *denotatum*, whatever that is.

Requests More Facts & Figures

"We have tremendous interest in the Facts and Figures section of the Jan. 4 issue of STEEL and would appreciate two copies for our use," writes Russell B. Lamb, director of industrial relations, John Oster Mfg. Co., Milwaukee.

"Such a comprehensive review of the 'State of the Union' should be of value to every company. We sincerely appreciate the time and effort taken to compile this information."

Identifying a Critical Need

One of the most fatal industrial diseases is entropy, the cancer that attacks your production facilities. Among its seven symptoms are narrowing profit margins and rising unit wage costs. By detecting these and the other deadly seven, you can diagnose and treat your case before you read your company's obituary in the profit and loss columns. Prescription: Immunization with a sound systematic program for replacing production equipment.

If you read and use the third article in our Program for Management series, "Production Efficiency—How To Find the Need for It," the prognosis for your company's health could be excellent. The article is coming next week.

We Hear from the Distaff Side

Fraulein Ursula Baumler, a secretary with Deutsche Edelstahlwerke Aktiengesellschaft, Krefeld, Germany, says she's an inveterate article clipper. She writes: "Please, if you don't want me to put out my eyes while loosening staples, perforate STEEL's pages near the binding."

Fraulein Baumler, save your sight. Just request tearsheets from our Editorial Service Dept.

On the average, each copy of STEEL is read by 3.5 people. If we perforated pages, your copy might suffer decimation before you get it.

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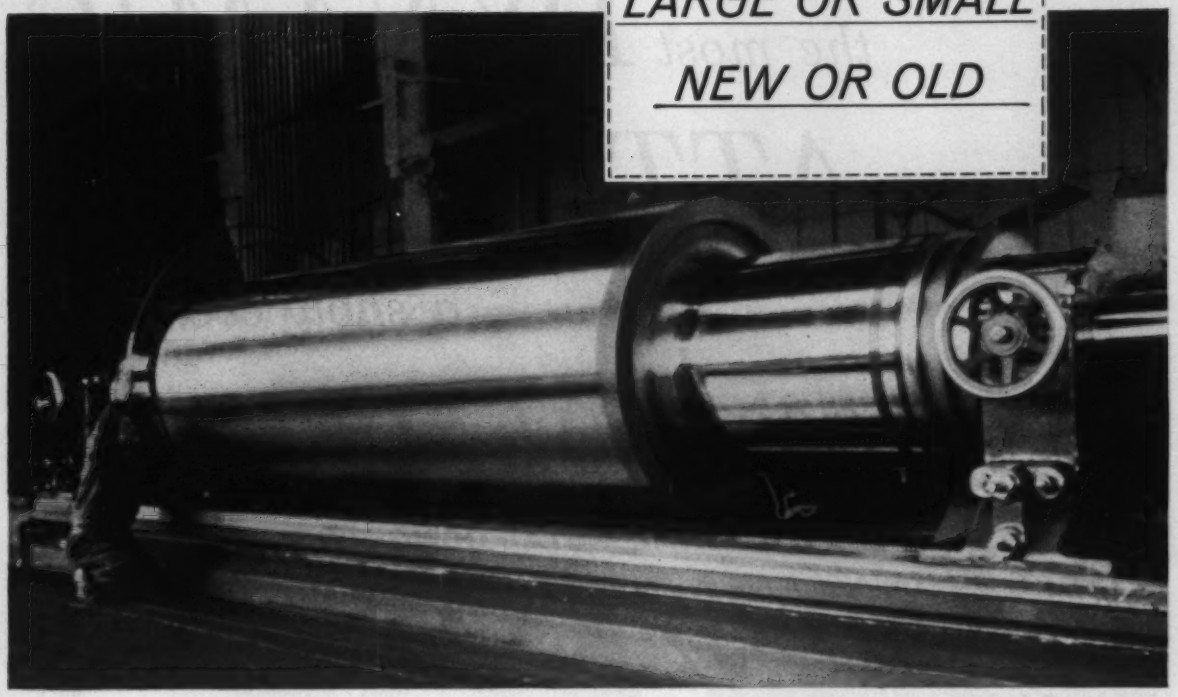

Your mill rolls will benefit from precisely duplicated NORTON wheels

You can match the grinding wheel exactly to the type of mill roll to be ground and be certain of the same outstanding features and performance . . . *every time* you grind with NORTON Wheels. For hot mill rolls, specify B12 Resinoid Wheels, for cold mill rolls, E6 Shellac Wheels. Both provide maximum performance on new rolls or scarred veterans.

NORTON Wheels are produced under process controls that assure precise duplication from wheel to wheel and lot to lot . . . in any quantity. Each has the same precise balance and uniform structure features that assure fast, smooth grinding and long wheel life.

Job testing in mills throughout the country has proved NORTON Wheels first in economy; in production per wheel; and in producing chatterfree finishes. They grind with top efficiency until the day they're discarded!

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Exhibitors at the Philadelphia Metal Show will gather their customers and prospects from the broad metalworking industry, including automotive, aircraft, appliance, ordnance, farm machinery, electrical machinery, instruments, and miscellaneous metalworking manufacturers . . . creating a thriving, effective, profitable marketplace. If your potential for sales lies in any of these areas, the Metal Show should take priority in your sales plan for maximum impact in the Soaring Sixties.

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Steel, the sinew that binds the strength of America, will serve as a magnetic attraction to call attention to **every** area of metals technology, ferrous and nonferrous, at the most metallic of all Metal Shows — the 1960 Philadelphia Metal Show, now blue-printed and ready to grow into its full dimensions. This new emphasis on the essential metals of industry reflects a growing specialization . . . a **focusing** of attention . . . to yield a greater benefit. In the evolution of the Metal Show, the time for such refinement has come. Now it is possible to achieve a concentration on **materials** that is unsurpassed anywhere for an intensive person-to-person interchange of information. The STEEL ARENA is the threshold to a whole new world of metals within the exhibits and technical sessions. The pre-eminence of a Metal Show of these dimensions is worth your closest consideration as an exhibitor — you are invited to share its benefit in any of the eleven areas of metals listed.

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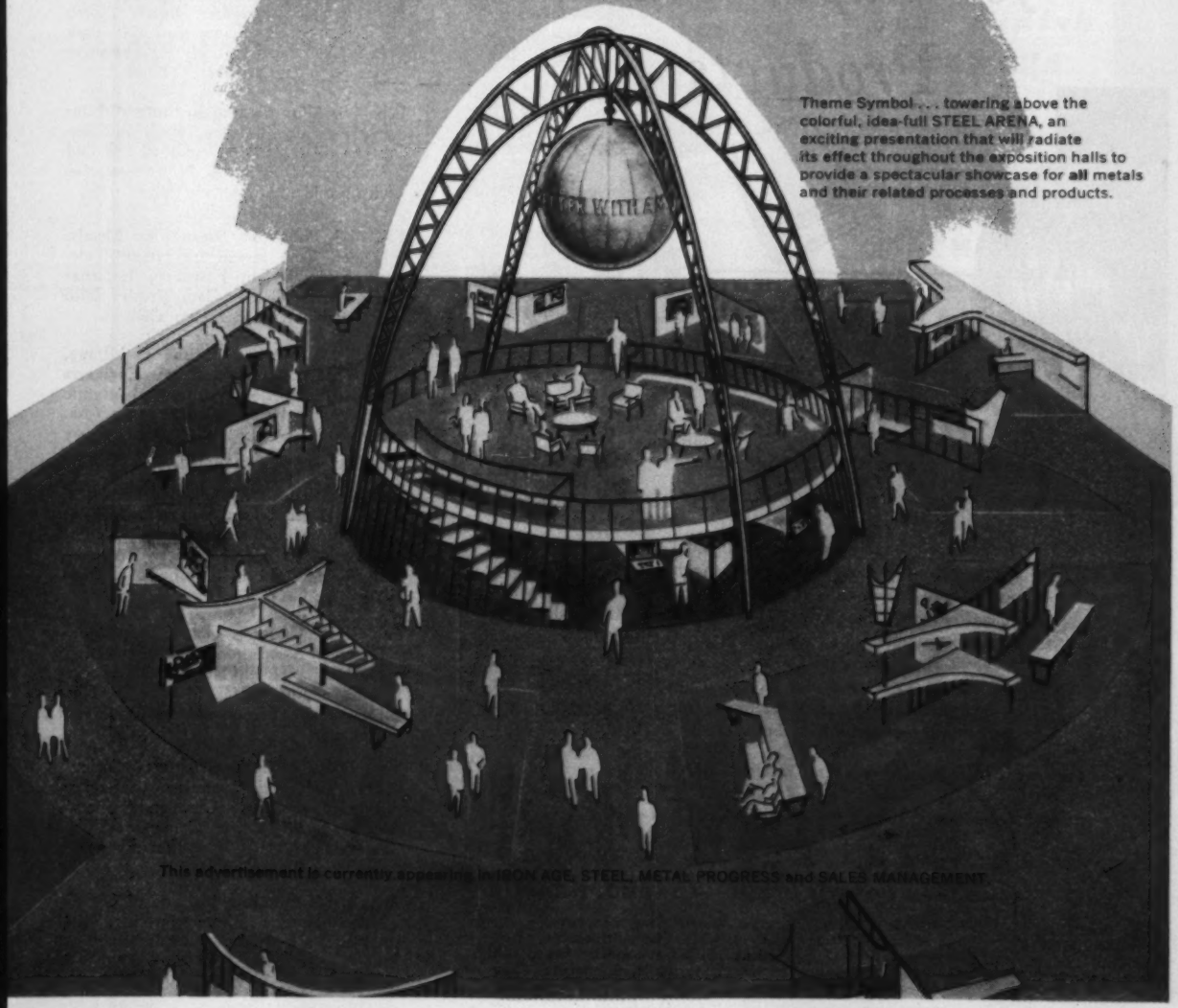
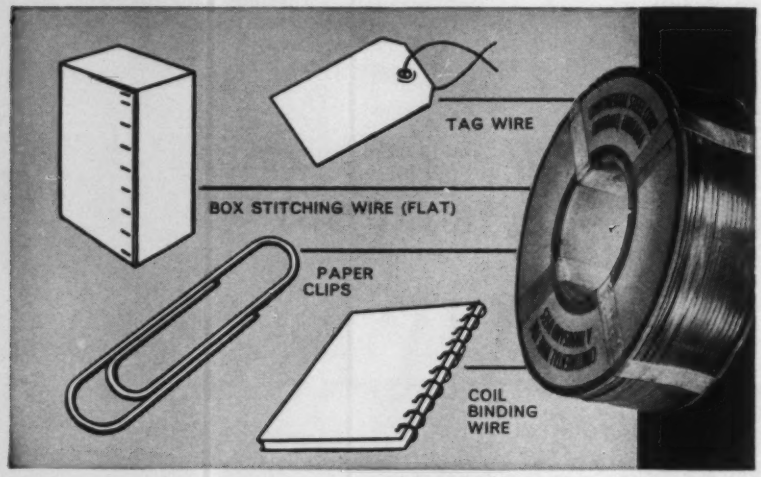


Theme Symbol . . . towering above the colorful, idea-full STEEL ARENA, an exciting presentation that will radiate its effect throughout the exposition halls to provide a spectacular showcase for **all** metals and their related processes and products.

This advertisement is currently appearing in IRON AGE, STEEL, METAL PROGRESS and SALES MANAGEMENT



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CALENDAR
OF MEETINGS

Feb. 1-4, American Society of Heating, Refrigeration & Air Conditioning Engineers: Southwest heating and air conditioning exposition, Memorial Auditorium, Dallas. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. President: E. K. Stevens.

Feb. 1-4, Instrument Society of America: Instrument-automation conference and exhibit, Rice Hotel and Sam Houston Coliseum, Houston. Society's address: 313 Sixth Ave., Pittsburgh 22, Pa. Executive director: William H. Kushnick.

Feb. 1-5, American Society for Testing Materials: Committee Week, Sherman Hotel, Chicago. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

Feb. 2-4, Society of the Plastics Industry Inc.: Reinforced Plastics Division conference, Edgewater Beach Hotel, Chicago. Society's address: 250 Park Ave., New York 17, N. Y. Executive vice president: William T. Cruse.

Feb. 4-5, Alloy Casting Institute: Winter meeting, Key Biscayne Hotel, Key Biscayne, Fla. Institute's address: 286 Old Country Rd., Mineola, N. Y. Executive vice president: E. A. Schoefer.

Feb. 4-6, American Society for Metals: Golden Gate metals conference, Fairmont Hotel, San Francisco. Information: ASM's Golden Gate Chapter, 1976 San Pablo Ave., Berkeley, Calif.

Feb. 14-18, American Institute of Mining, Metallurgical & Petroleum Engineers Inc.: Annual meeting, Sheraton-Atlantic and Statler-Hilton Hotels, New York. Institute's address: 29 W. 39th St., New York 18, N. Y. Secretary: E. O. Kirkendall.

Feb. 15-17, American Management Association: Midwinter personnel conference, Palmer House, Chicago. Association's address: 1515 Broadway, New York 36, N. Y.

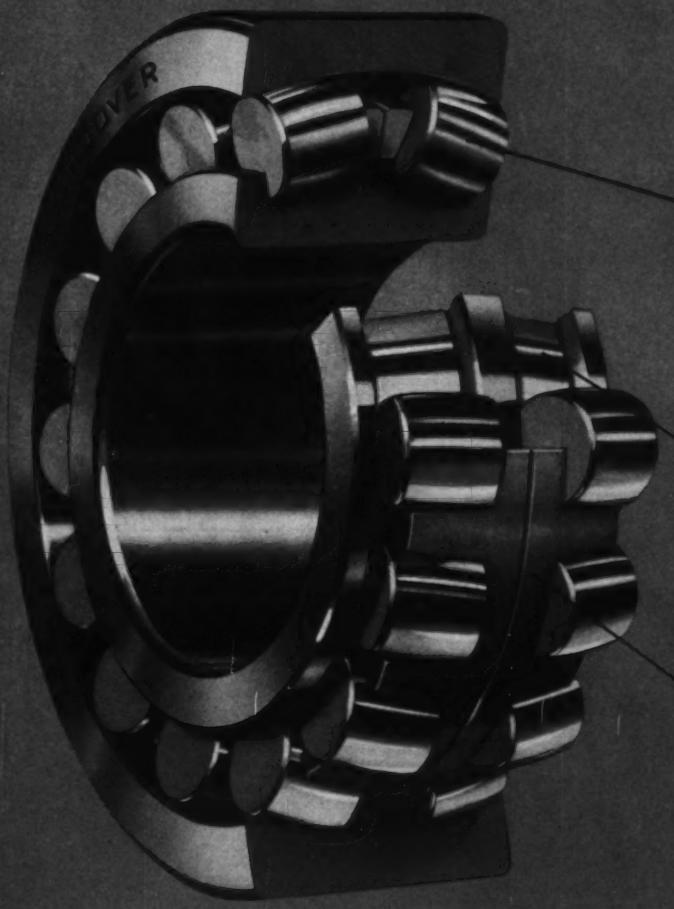
Feb. 16-18, Caster & Floor Truck Manufacturers Association: Annual meeting, St. Moritz Hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: Harry P. Dolan.

Feb. 17-18, Malleable Founders' Society: Technical and operating conference, Wade Park Manor, Cleveland. Society's address: 781 Union Commerce Bldg., Cleveland 14, Ohio. Executive vice president: Lowell D. Ryan.

Feb. 21-24, American Institute of Chemical Engineers: Winter meeting, Biltmore Hotel, Atlanta. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

hoover quality

...WHAT IT MEANS IN SPHERICAL ROLLER BEARINGS



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Super Finish RACEWAYS

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Large size rollers are *Super Finished* to a mirror-like smoothness to minimize friction.

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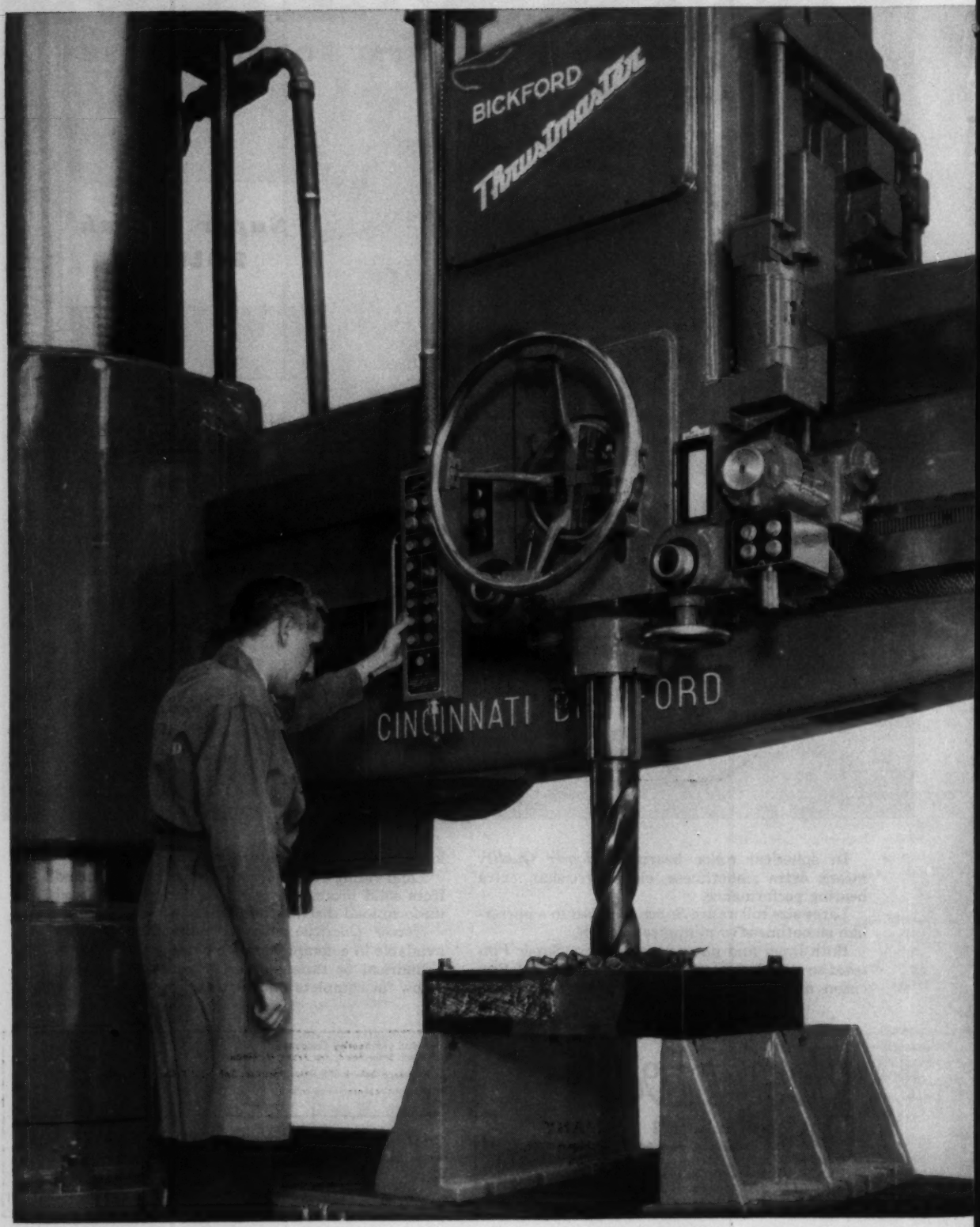
City_____ Zone____ State_____

Morse Drills



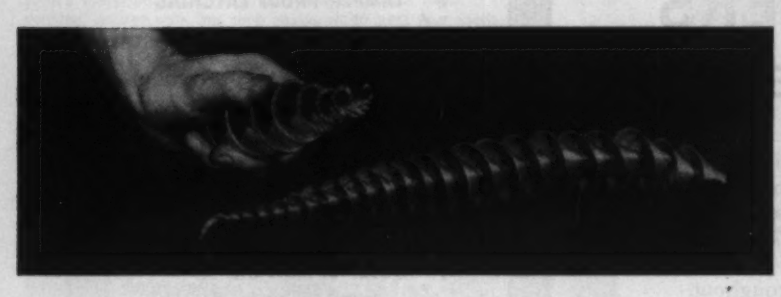
Do It Again...

TAKE THE THRUST OF "THE WORLD'S MOST POWERFUL RADIAL DRILL"

To demonstrate their new 50-horsepower, pushbutton-operated Thrustmaster...the most powerful radial drill ever built... Cincinnati Bickford tooled up with the toughest twist drill on the market—Morse.

Why Morse? Because other drill manufacturers threw up their hands at producing a drill to match the Thrustmaster's power. But Morse took on the job, applied a regular taper shank drill right off the shelf that more than meets the requirements of this exceptionally powerful machine.

If you haven't already experienced the demonstrated superiority of the world's most complete line of quality cutting tools, call your Morse-Franchised Distributor today. He'll gladly show you the practical economies of buying the best... Morse Cutting Tools.



Look at these chips made during demonstration of the Thrustmaster.

Feed: .087" per revolution at 105 RPM

Drill: Regular Morse Taper Shank Drill (style 1302) driven in solid steel.

Morse CUTTING TOOLS

MORSE TWIST DRILL & MACHINE COMPANY
NEW BEDFORD, MASSACHUSETTS

WAREHOUSES IN NEW YORK, CHICAGO, DETROIT, DALLAS, SAN FRANCISCO

A Division of VAN NORMAN INDUSTRIES, INC. VN

MORSE *means* "THE MOST" *in Cutting Tools*

2130

REPUBLIC STEEL LOCKERS

...top Quality with Economy

Republic Steel Lockers offer industrial management decided advantages in service and economy.

Big and roomy—interiors are well designed for convenience and ventilation. Strong and sturdy—made of steel to assure complete protection of personal effects and tools. Heavy-duty construction throughout.

Bonderized! This exclusive Republic feature provides a superior base for the baked-on enamel finish. Offers protection against rust and corrosion. Restricts bumps, scratches, abrasions of everyday service to the site of the injury. Reduces maintenance costs to a minimum.

Republic Steel Lockers are available with any of the popular locking devices. Handle is attached with a tamper-free Gulmite screw and lockwasher. Practically pilfer free.

Call your Republic-Berger representative. He will help you with your locker planning and assume full responsibility for complete installation.

QUALITY CONTROL CHART

- ✓ ALL PARTS BONDERIZED
- ✓ 16-GAGE FORMED CHANNEL FRAME
- ✓ CONTINUOUS DOOR STRIKE
- ✓ POSITIVE AUTOMATIC LOCKING
- ✓ TAMPER-PROOF LATCHING
- ✓ ALL PARTS FLANGED FOR STRENGTH
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- ✓ ALUMINUM BALL-POINT HOOKS
- ✓ BAKED-ON ENAMEL FINISH
- ✓ QUIET OPERATION
- ✓ SNAG-PROOF CONSTRUCTION
- ✓ ENGINEERED VENTILATION
- ✓ POSITIVE LATCHING
- ✓ LOW MAINTENANCE

OK for purchase

CALL YOUR REPUBLIC-BERGER REPRESENTATIVE, OR WRITE...

COMPLETE CONTAINERIZATION... Republic Box and Skid Units provide for multi-purpose service for delivery of semi-finished parts to production, feeding parts to machines, receiving finished parts as they come off the machining line, and storage. Complete production and inventory control from raw materials to finished products. Materials handling engineers will help you with your planning.

REPUBLIC WEDGE-LOCK® SHELVING is designed to handle heavy-weight storage. Wedge-Lock construction includes the three prime essentials of good shelving: 1. a post that will not bend, 2. a reinforced shelf that does not sag, and 3. a concealed sway-proof joint. Republic's Berger Division offers a complete line of shelving, storage units, and shop equipment to meet your needs.

REPUBLIC METAL LUMBER® solves framing problems fast. Simply measure, cut, assemble with ordinary bolt and nut fasteners. METAL LUMBER is fabricated from cold rolled steel to assure uniform physical properties, and high strength-to-gage ratio. Bonderized after fabrication for complete protection of all exposed surfaces. Available in two gages, two widths, in standard bundles of either 10- or 12-foot lengths. Write for more information.

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World's Widest Range of Standard Steels and Steel Products

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Please send additional information on the following:

- ☐ Republic Steel Lockers
- ☐ Materials Handling Equipment
- ☐ Wedge-Lock Shelving ☐ METAL LUMBER

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

ADAMS FACT FILE #2

PLANT AIR

Moisture Chief Cause of Trouble . . .

Every company today is looking for ways to offset the increased costs of labor, material, equipment and services. At a gasoline station you expect "Free Air", but in industry it is a major expense. Perhaps in your own plant, for an investment in a few minor compressed air system alterations, significant savings are possible.

Water, sludge, rust, oil and dirt in compressed air systems are prime causes of maintenance and production down-time. Water vapor condensing in air lines tends to corrode the piping. Also, water present in the piping may freeze during winter, causing serious reduction of compressed air supply. Such restrictions are often difficult to locate and thaw. This same line moisture may emulsify lube oil destroying its lubricating value and the resultant mixture has high fouling characteristics. Frequently, ice will form within the tool itself since expanding air cools the moisture . . . tool efficiency will be seriously affected.

Some of the Other Problems Created By Wet Compressed Air . . .

Wet compressed air is not only a construction and production tool problem. Faulty paint jobs, contaminated chemical and food products can often be traced to moisture laden compressed air. Waterhammer, unequal pipeline thermal expansion and line leaks also result from collected moisture. In addition, air lost through traps, and in blow-down of compressed air lines provide no useful work . . . represent a sizeable power loss.

You Can Lick Compressed Air Moisture Problem . . .

All of these hidden costs can be virtually eliminated by the installation of an Adams Aftercooler and Cyclone Separator between the compressor and receiver tank. By cooling discharge air to within 10° F. of cooling water temperature — guaranteed with Adams standard Aftercoolers — the moisture can be removed at the separator. Pressure loss is less than one-half pound on these units including the separator. In severe cases, moisture removal of over 90 per cent can be obtained by cooling the air with Adams 2° Aftercooler to within 2° F. of water temperature.

Air Filter for Final Protection at Point of Use . . .

As an added safeguard for expensive tools and equipment, an Adams Poro-Stone Air Filter should be installed just before the air is used. These filters remove all solid material picked up by the air stream. With an Adams Aftercooler, Cyclone Separator and Air Filters clean, dry, trouble-free air is supplied to your production tools. You get continuous service with minimum maintenance.

For further information on how the complete line of Adams air equipment can solve your compressed air problems, write today for your free copy of Bulletin No. 712 on Aftercoolers and Bulletin No. 117 on Poro-Stone Air Filters from the R. P. Adams Company, Inc., 222 East Park Drive, Buffalo 17, New York.

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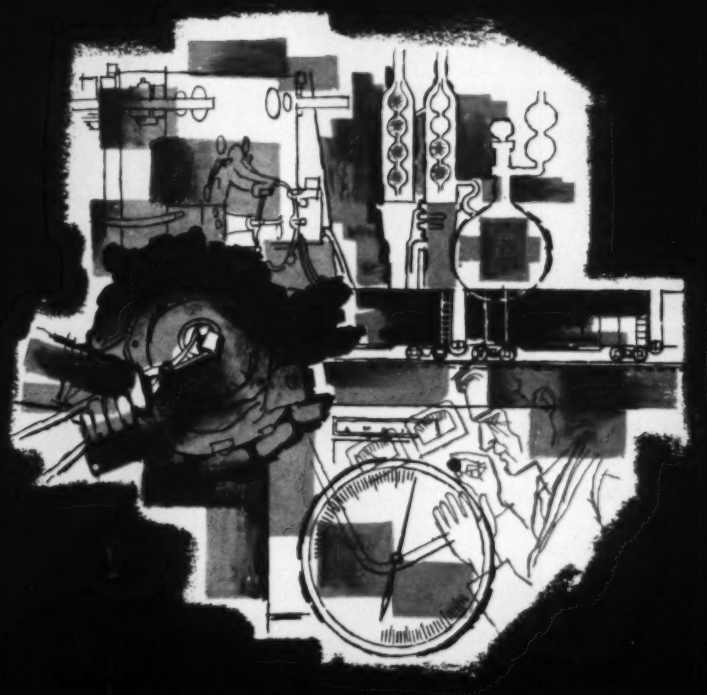
aluminum castings that improve products and meet cost requirements



Now CENTRAL FOUNDRY offers in aluminum . . .

- CAPACITY to produce in quantity and ability to deliver on schedule
- HIGH STANDARDS of quality through rigid physical, chemical and metallurgical testing and control
- CASTING METHODS best suited to all types of design and production requirements
- COMPLETE ENGINEERING SERVICES to cut costs and improve casting design

CAPACITY to produce in quantity and ability to deliver on schedule

The Fabricast plants of Central Foundry Division, located at Bedford, Indiana, and Jones Mills, Arkansas, have the facilities and the engineering services necessary to produce quality aluminum castings in production quantities and to deliver them on schedule. Complete pattern and die shop facilities are available to make wood and metal patterns as well as dies for permanent mold, die cast and investment parts.

This is advantageous to our customers because engineering changes can be incorporated in their equipment in a minimum of time; our trained personnel can give prompt delivery of intricate dies and experimental pattern equipment can be turned out readily. All grinding and cutting machinery for die work is available, including facilities to make cast-to-size parts; a completely equipped heat treating department utilizes salt bath furnaces.

Two modern, fully equipped plants located to serve you best.

Multiple-station permanent molding machines turn out large quantities of quality aluminum castings on schedule.

Central Foundry Division has a well equipped physical testing laboratory in which all of the standard physical tests on alloys can be performed. Special tests can also be conducted on castings to simulate service requirements if such testing is required.

high standard of QUALITY through rigid physical, chemical and metallurgical testing and control

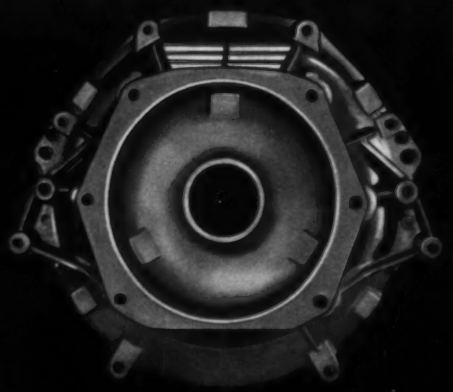
The Fabricast plants of Central Foundry Division maintain high standards of metallurgical quality for their cast products with well-equipped chemical, spectrographic, metallographic and physical testing laboratories. These facilities include many of the industry's finest scientific instruments and testing devices; they are used to maintain rigid control over every stage of casting production from original alloying operations to finished casting.

casting METHODS best suited to all types of design and production requirements

It will help you, the designer of castings, to know that the Fabricast plants of Central Foundry Division produce aluminum castings by any one of four methods; die-casting, permanent mold, semi-permanent mold and sand casting. One of these methods will provide the best aluminum casting at the lowest possible cost. Before selecting the method by which an aluminum part is to be cast, consideration must be given to the design of the part, its size and its end use. Of equal importance is the number of parts to be produced and the alloy to be used. Central Foundry Division engineers, with years of specialized knowledge and training in casting aluminum, can be called upon for assistance in the design, alloy specification and in the choice of the casting method best suited to the production of your part.

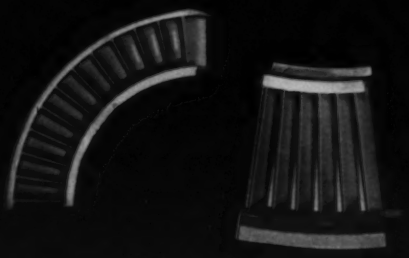
Automotive Piston cast by permanent mold process.

Brake Drum cast by permanent mold process.



Flywheel Housing made by the die casting process.

Rear Bearing Retainer made by the die casting process.



These Vane Segments are produced by investment casting, (an adaptation of the lost wax process). This method is used for the production of small precision parts from high temperature alloys and is the best possible method of casting intricate parts which must be cast-to-size.

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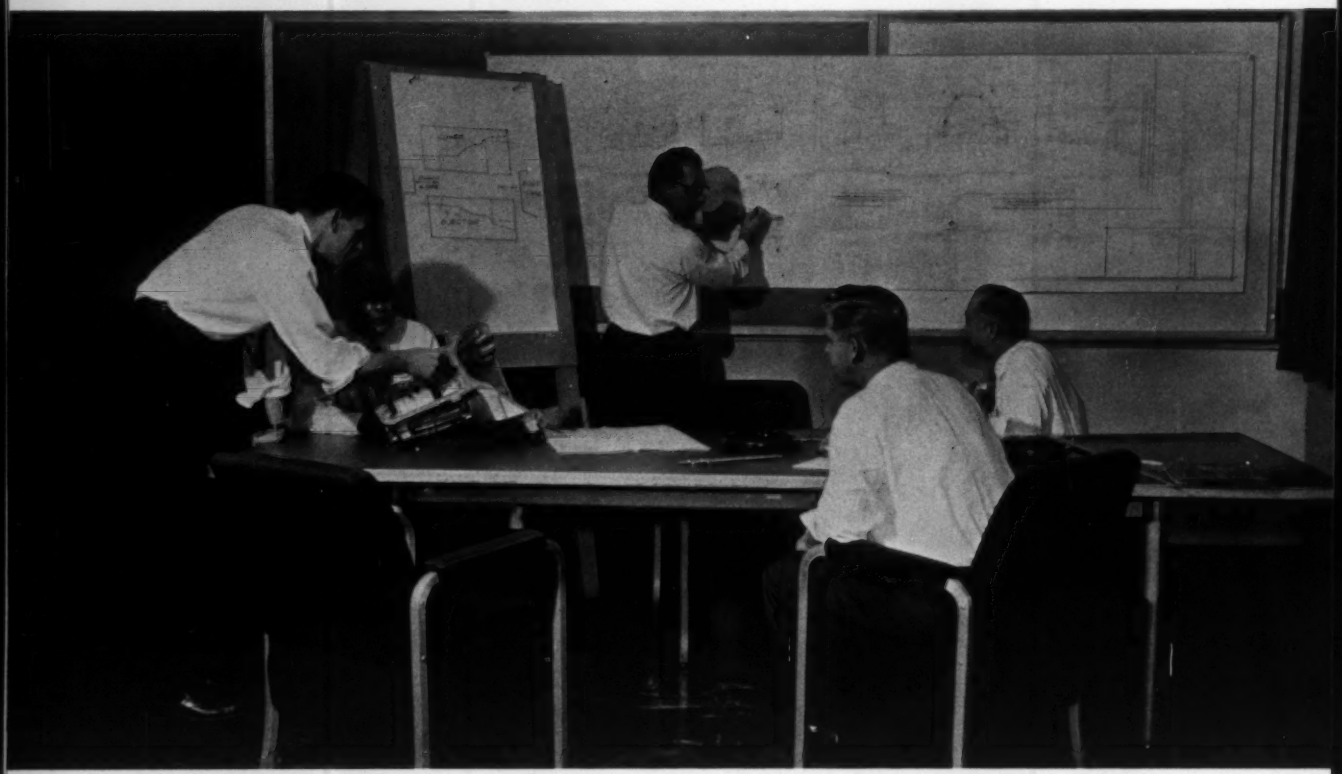
Dept. D

ENGINEERING SERVICES cut costs and improve casting design

A complete and competent staff of product development engineers, foundry engineers and modern engineering services are available to our customers to assist in casting design considerations. Frequently, foundry suggestions on casting design can reduce the cost of experimental and production parts and at the same time improve the part functionally. Since casting design determines casting cost, close contact between foundry engineer and design engineer is necessary to create economical casting designs which are easily adapted to the high production methods utilized by Central Foundry.



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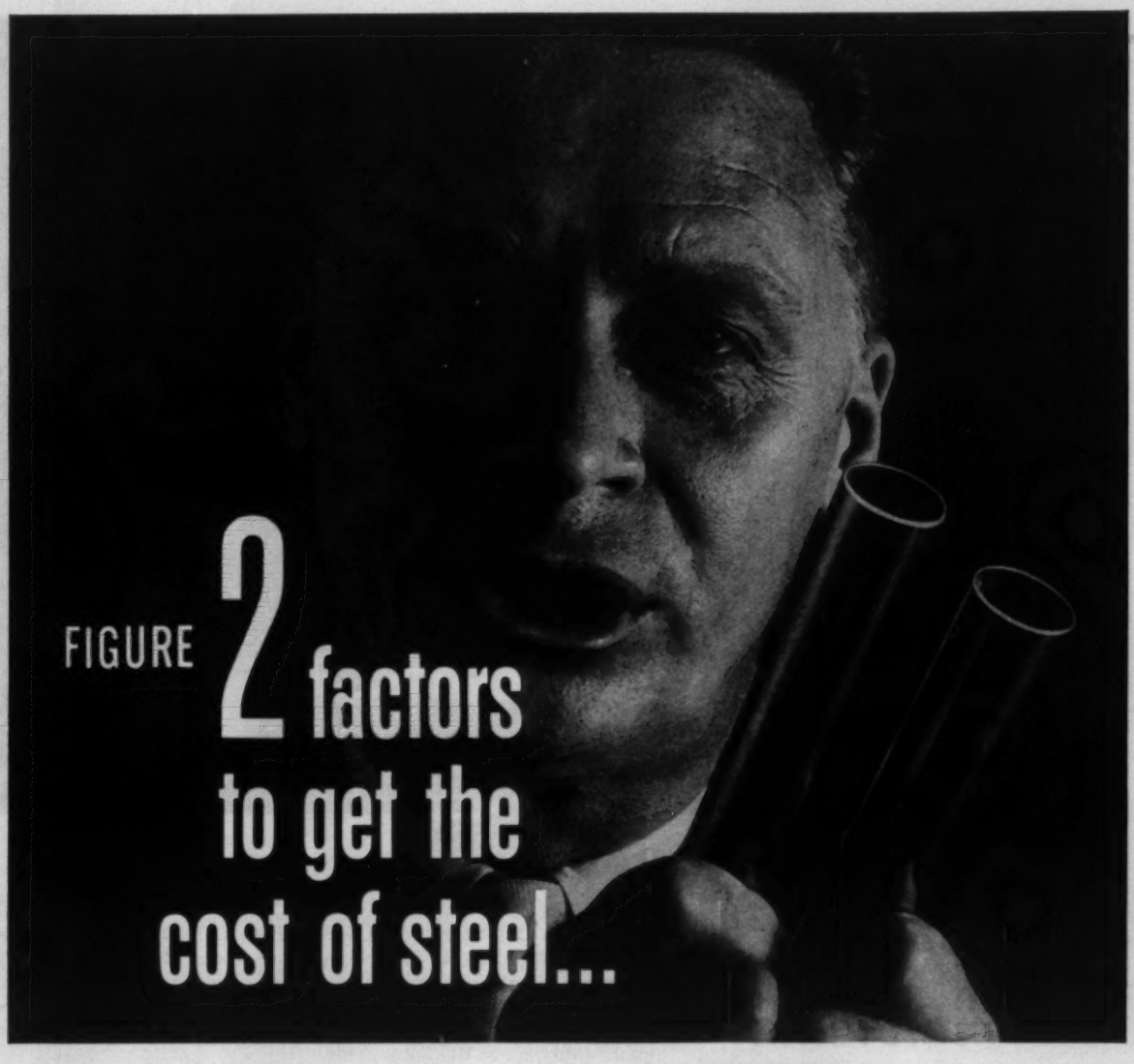


COST OF POSSESSION is part of your final cost!

When you keep a miscellaneous inventory of steel, you inflate your costs and tie up capital *uselessly*.

You can avoid this. Many smart cost-minded steel users are buying all or a major part of their steel needs from Steel Service Centers. They get stock cut-to-size and delivered promptly.

Couldn't this save you money too, by reducing the costs of storage, space, handling, cutting, waste and obsolescence?

Next time you order steel, compare price plus cost of possession with what Service Center steel would cost you. For more information, get the booklet, *What's Your Real Cost of Possession for Steel?* from your nearby Steel Service Center. Or write Steel Service Center Institute, Inc., 540-G Terminal Tower, Cleveland 13, Ohio.

COST OF POSSESSION FOR STEEL IN YOUR INVENTORY

Per ton delivered	_____
Cost of capital:	
Inventory	_____
Space	_____
Equipment	_____
Cost of operation:	
Space	_____
Materials handling	_____
Cutting & burning	_____
Scrap & wastage	_____
Other costs:	
Obsolescence	_____
Insurance	_____
Taxes	_____
Accounting	_____
TOTAL	_____

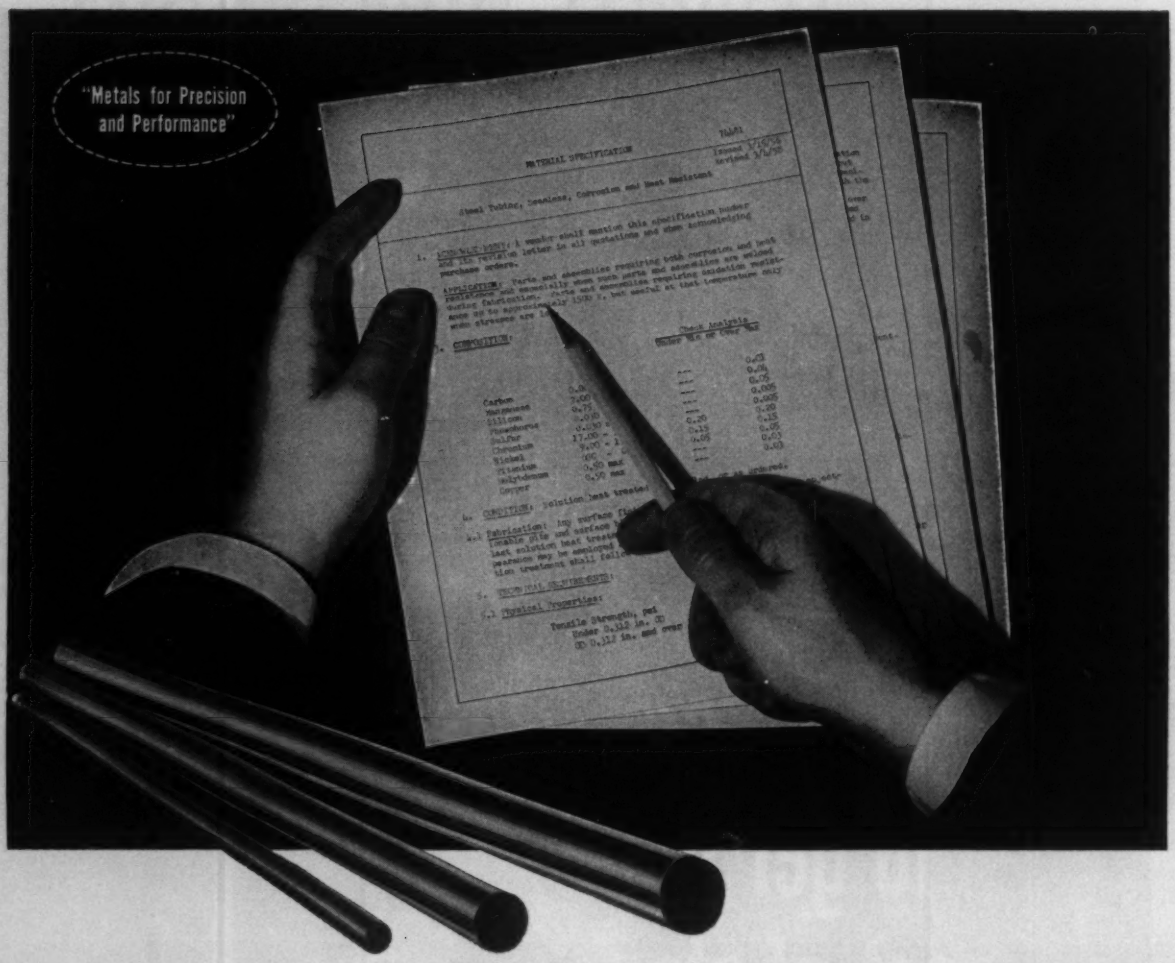
COST OF FREEDOM-FROM-RISK STEEL FROM YOUR STEEL SERVICE CENTER

Per ton, cut-to-size, and delivered

TOTAL _____

STEEL SERVICE CENTER INSTITUTE

...YOUR STEEL SERVICE CENTER



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That special tubing you need doesn't have to be a frustrating problem — BISHOP delights in tackling tough specs. BISHOP is uniquely equipped to handle specials—long on experience and capacity, short on delivery. You'll get help within 24 hours from a Quick Service Team of sales, metallurgical and production experts—and unexcelled quality tubing . . . the finest made.

Briefly, the Bishop Line . . .

STAINLESS STEEL TUBING Seamless, Welded & Drawn	Mechanical, Aircraft, Capillary, Hypodermic also NEW Stabilized and L grades, precipitation hardening alloys	0.008″ to 1.000″ OD 0.003″ to 0.083″ wall
NICKEL & NICKEL ALLOY TUBING	All standard grades	up to 1.000″ OD 0.065″ wall max
TUBULAR FABRICATED PARTS	Flanged, flared, milled, slotted, swaged, threaded	
GLASS-TO-METAL SEALING ALLOYS	Low expansion alloys for glass sealing applications	
CLAD METALS & COMPOSITE WIRES	Base metals & precious metals in various combinations	
PLATINUM GROUP METALS	Fabricated products—chemicals	
CATALOGS, DATA SHEETS ON THE ABOVE SENT PROMPTLY ON REQUEST		

Send in your individual specs for prompt handling, thorough analysis, prices, deliveries. Write, wire or phone NIagara 4-3100 or call your local steel service center.

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Versatility and quicker setups cut grinding costs for toolrooms and short run production

Landis 10" x 20" and 10" x 24" Universal Cylindrical Grinders feature Microsphere Wheel Spindle Bearings for maximum accuracy, high finishes and dependable operation.

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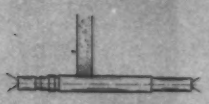
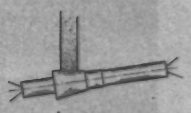
Grinding jobs which can be done on this machine


traverse and infeed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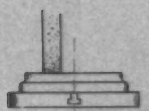
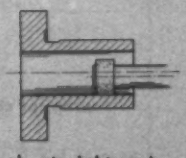

face and angle


internal—straight and angle

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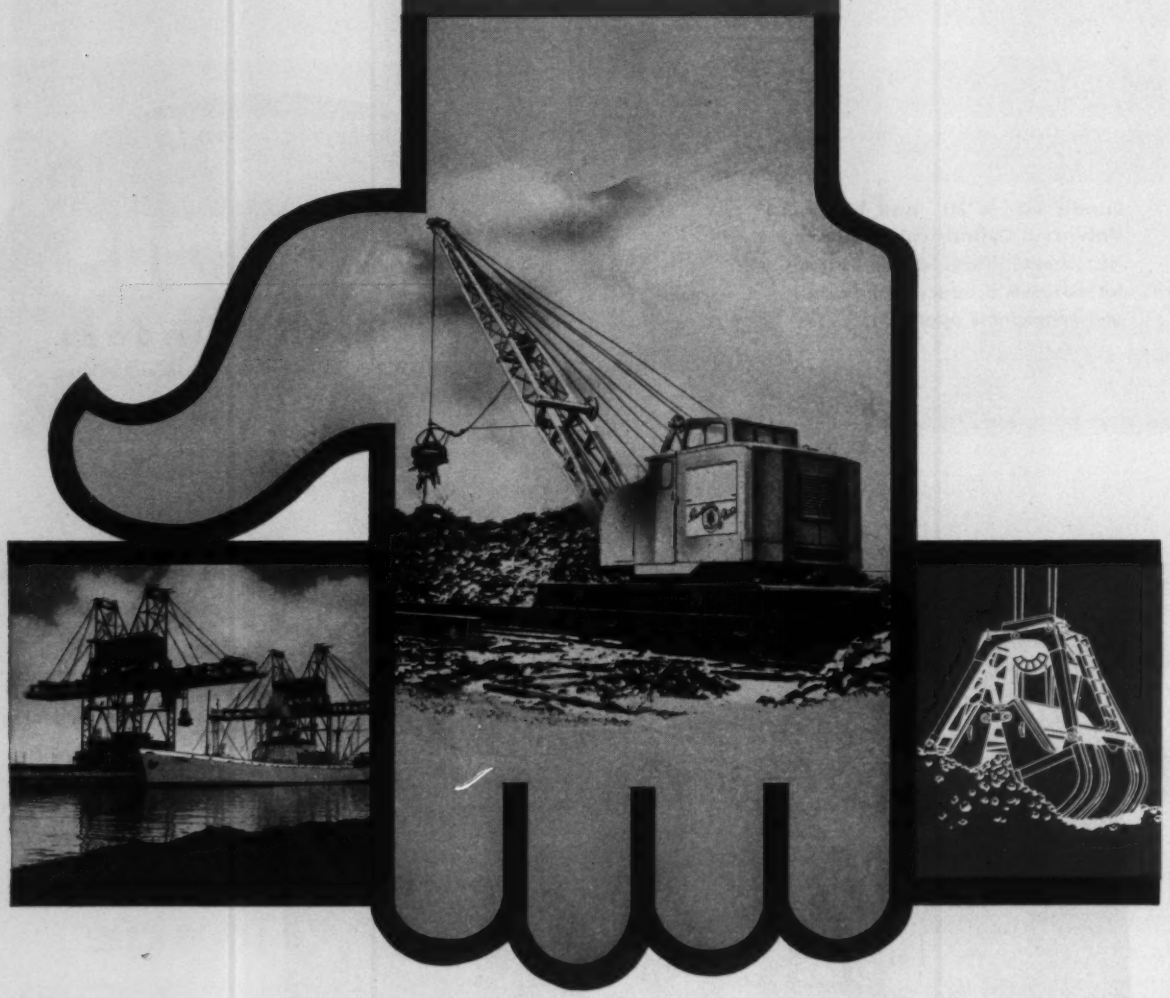
heavy bulk material at
minimum per ton cost



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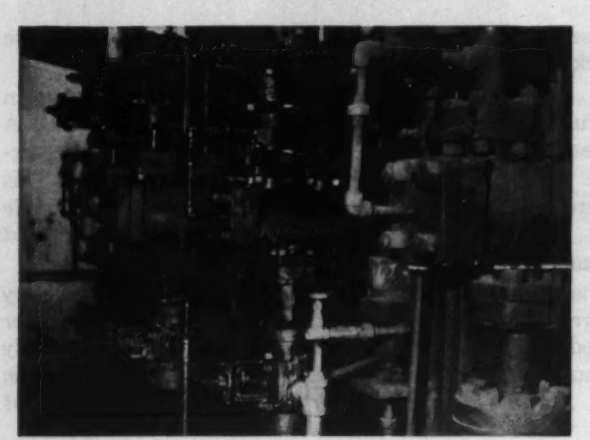
split-second control with Homestead® Operating Valves keeps steel plate rolling!



Solenoid-hydraulic pilot controlled 4" and 2½" Hydro-Cushion Homestead Operating Valves; and Lever-Seald Hydraulic Stop Valves; 800 pounds working pressure.

Six days a week, twenty-four hours a day, 250 times an hour, the tilt tables and middle roll of an East Coast Plate Mill are exactly positioned without shock, and held without creepage, by Homestead Operating Valves. This precision control has permitted record-breaking rolling of the hot steel slabs into plate.

Through more than *three and one-half million* split-second rollings during the two years the 2½" and 4" Hydro-Cushion Homestead Operating Valves have been in service, not one shutdown has been required for valve maintenance! Performance records such as these, are assured by the protected seat and cushioning action of the Homestead Valves.

For any hydraulic control problem, there is a Homestead Operating Valve to meet your needs. Send today for Reference Book 39-6.

Please send Reference Book 39-6 and prices on all types of Homestead Operating Valves. 98

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Company.....

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City.....Zone.....State.....

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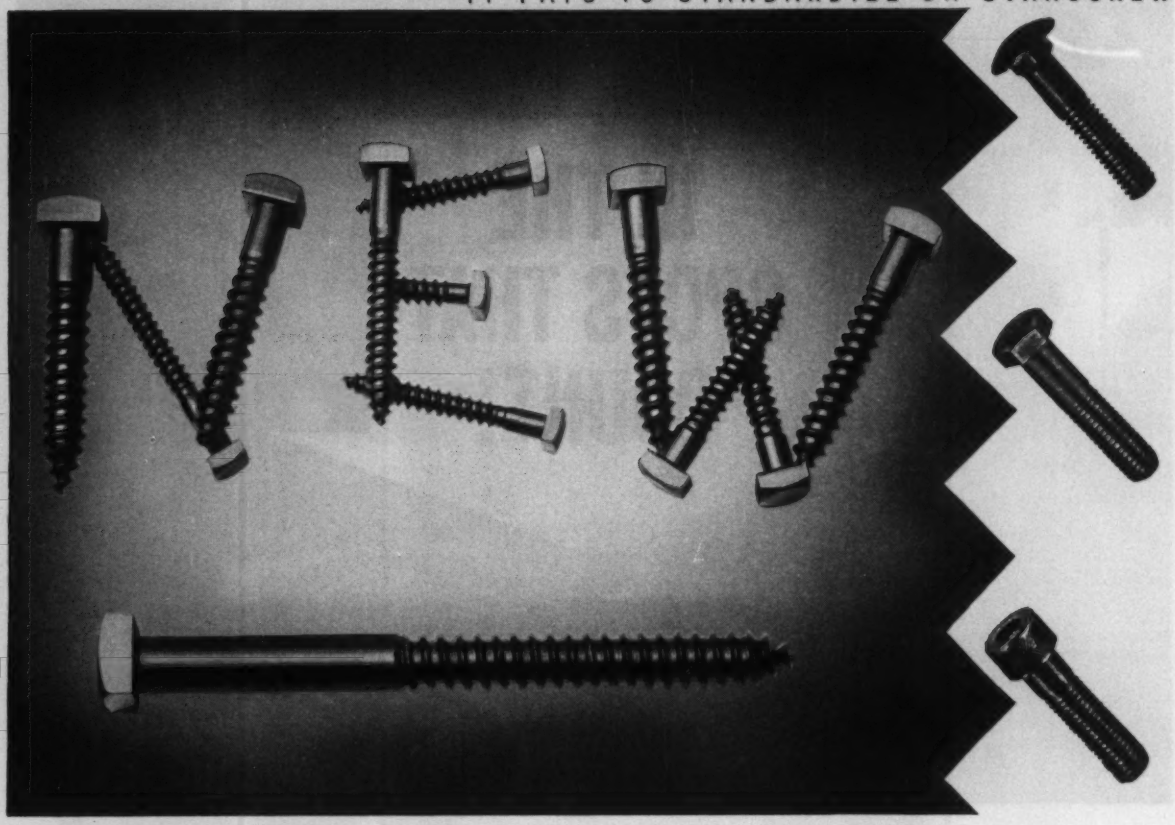


Lag Bolts Expand Stanscrew Line To Over 5,500 Different Fasteners

Hex machine bolts . . . carriage bolts . . . and now, a broad selection of lag bolts . . . all quickly available from Stanscrew.

These new gimlet point lag bolts, all with full-sized shanks, conform to ASA Standards and are produced to Stanscrew's rigid criteria of fastener quality. Almost 100 sizes are offered as stock items.

With lag bolts, the Stanscrew line now covers more than 5,500 standard catalogued fasteners . . . carefully developed to answer the overwhelming majority of American industrial needs. Included are socket, set, and cap screws . . . nuts . . . dowel and taper pins . . . pipe plugs . . . studs . . . and, of course, Stanscrew's complete bolt series.

Each of these 5,500 fasteners is always in stock at three conveniently located plants. A rigidly enforced Stanscrew policy assures regular orders are shipped within 24 hours. This means your Stanscrew distributor can provide especially fast service on all occasions . . . and be particularly helpful in emergencies.

Your Stanscrew distributor will also be happy to arrange a visit from the Stanscrew fastener specialist. His recommendations on your assembly procedures can often result in significant savings. Why not call your Stanscrew distributor today?

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

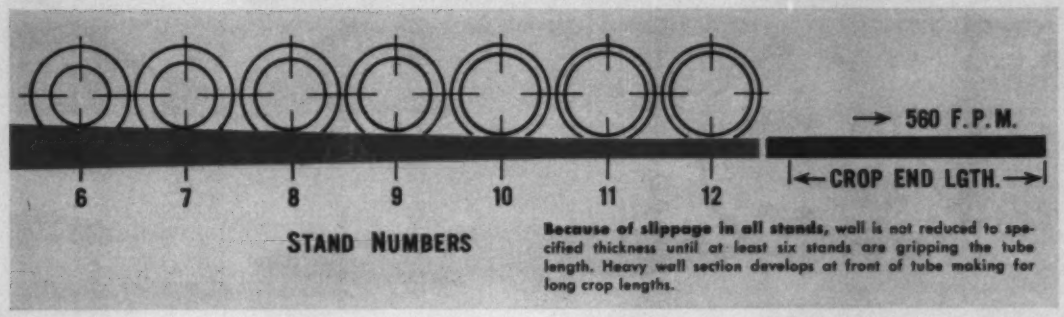
STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

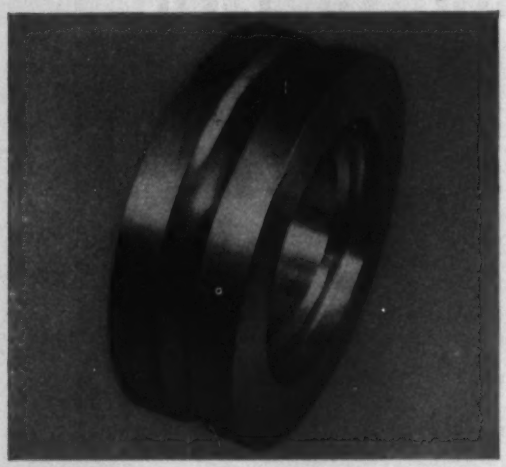
Cast mill rolls • Johnston cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

Balancing bite, slip and wear in stretch-reducing rolls



Because of slippage in all stands, wall is not reduced to specified thickness until at least six stands are gripping the tube length. Heavy wall section develops at front of tube making for long crop lengths.

From the roll maker's standpoint, the stretch-reducing mill is full of contradictions. The rolls must provide good "bite" on the tubing, without squeezing it so hard that it buckles. Actually, this is impossible in a pair of stands: in practice, operators have found that at least six stands are needed before the mill starts to produce any reduction in the tube wall. In other words, so much slippage occurs that the tube length is not being stretched at all before the entering end is gripped by the rolls in the sixth stand.



Roll for early stand of a stretch reducing mill, showing pass. Wear is most severe at sides of passes where slippage is at a maximum.

The greater reductions taken in this type of mill as compared to a sinking-sizing mill, combined with the large amount of slippage, make it imperative that the rolls used show good and uniform hardness penetration. Naturally, extremely high hardness is out of the question because of the necessity for good "bite" in order to develop the tension that stretches the tube. However, uniform hardness over the entire pass makes for even wear, easier adjustment as wear increases, and finally, longer runs before redressing becomes necessary.

Actually, our experience with rolls in this kind of service indicates that wear is most severe at the edges of the pass. Hence, any tendency toward lower hardness at the center of the pass may actually make for a balanced rate of wear over the entire working surface.

Mack-Hemp *Technigrain*® low alloy iron rolls consistently turn in enviable performance records in stretch-reducing mills. In the larger newer mills we recommend our nickel alloy iron *Nironite*® annealed to a low hardness for best possible wearing qualities. Both types are carefully controlled to assure an even hardness penetration, and keep slippage to the necessary minimum even with the relatively high reductions taken in each stand.

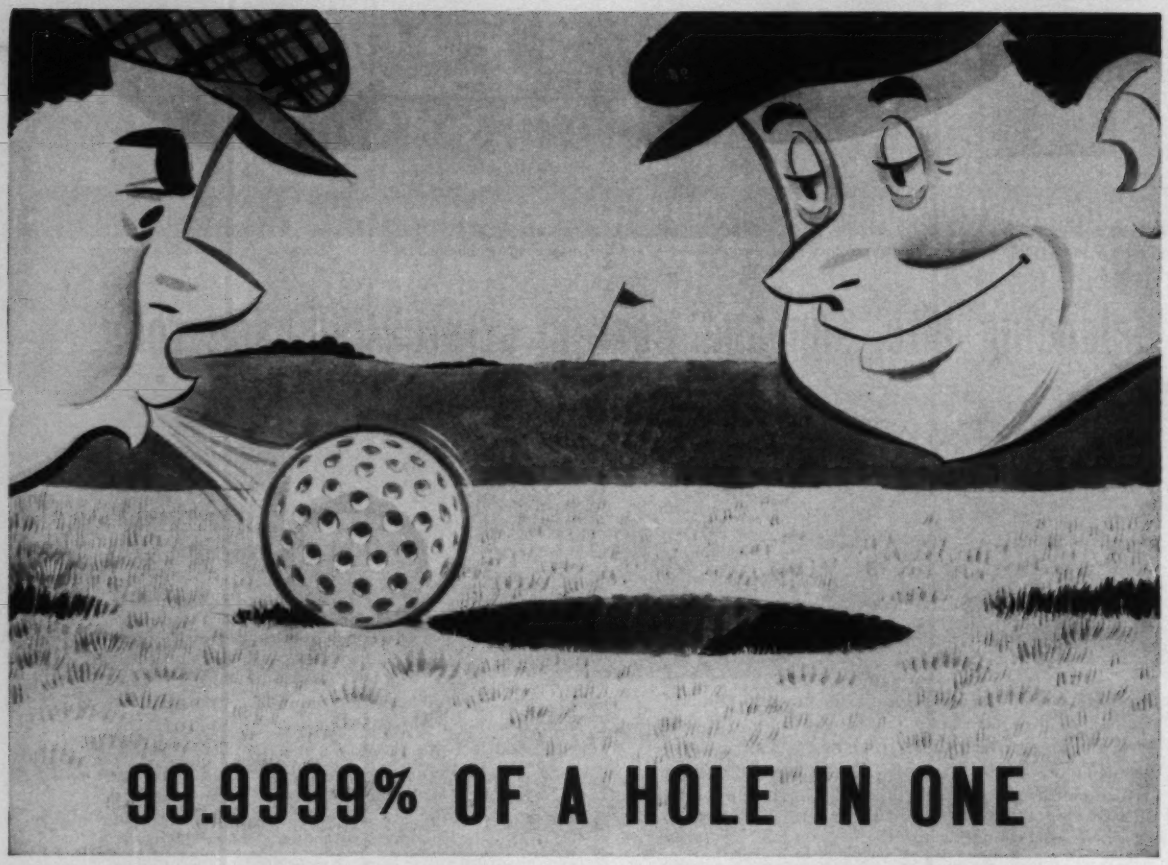
Mack-Hemp rolls are serving in every type of mill, from the oldest to the very latest designs. As a result, we are adding constantly to our store of data on roll performance. We are pleased whenever roll users call upon us for advice on matters of roll use and selection . . . if you have a specific problem why not 'phone or write us today?

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY

Presses, Rolling Mills, Special Machinery



99.9999% OF A HOLE IN ONE

...BUT IT STILL COUNTS TWO!

Just leave the same percentage of "off-center" weight in a high-speed rotating part and you have a real problem of unbalance. You have a customer problem, too, because unbalance left in rotating parts and assemblies generates destructive vibrations that shorten service life and cause noisy, unsatisfactory performance "in the field."

Because balancing is basically a quality control operation, you cannot afford to be merely "close."

Experienced buyers of balancing equipment have learned to make a careful analysis of their requirements as to tolerances allowable, accuracy of plane separation, angular location and measurement of unbalance, practical correction methods, speed of handling, etc., so that they can properly *specify* the equipment best suited to the job.

A new booklet, "Performance Tests for Balancing Machines," is now available from Gisholt. It explains basic considerations in selecting the proper equipment and in specifying for particular needs. It also suggests tests which no *reliable* supplier of balancing machines will refuse to perform. These tests will quickly show whether his balancer will meet your tolerance and production requirements—*before* you buy.

A copy of this booklet is available on request. Ask your Gisholt Representative or write us for your free copy.

GISHOLT 1SV1 BALANCER with integral correction drilling unit. Single-plane unbalance in automatic transmission parts is measured, located, corrected and the work inspected in one handling. Production rate—60 pieces per hour.

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

Turret Lathes • Automatic Lathes • Balancers
Superfinishers • Threading Machines
Factory-Rebuilt Machines with New Machine Guarantee

Investigate Gisholt's Extended Payment and Leasing Plans

Quality in Ascendancy

The superiority of the vast number of products that are — and can be made from Roebling Cold Rolled Flat Spring Steel is a fact known throughout all industry.

You pay for mechanical and dimensional uniformity when you buy flat spring steel . . . you get it when you buy Roebling.

For information on how our products can help yours, write Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division
The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

I-R Size 810 IMPACTOOL
¾" Square Drive

NEW DESIGN FASTER SPEED GREATER POWER

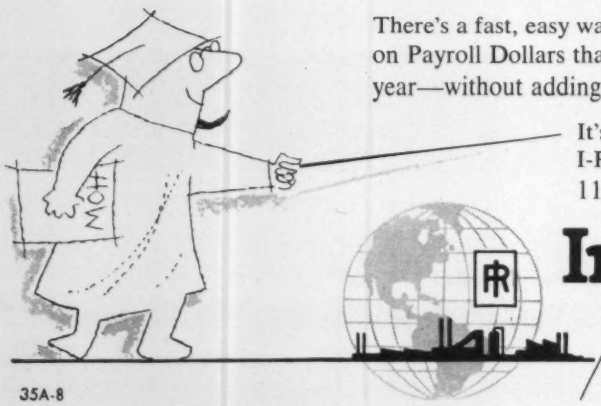
. . . to give you an

ANNUAL DIVIDEND ON PAYROLL DOLLARS!

If your operators are using older model Impactools on fastening operations, you can increase their man-hour productivity by as much as 750 Payroll Dollars in one year, just by replacing the older tools with brand new I-R 810 Impactools.

Multiply these Annual Dividend Savings by the number of Impactool operators in your plant, and you can see why management today is taking a new look at portable tool operations.

There's a fast, easy way to calculate the amount of Dividend Savings on Payroll Dollars that new I-R Tools can help you earn in just one year—without adding to your present payroll.



It's yours without obligation. To get it, call your I-R AIRengineer today. Or write Ingersoll-Rand, 11 Broadway, New York 4, N. Y.

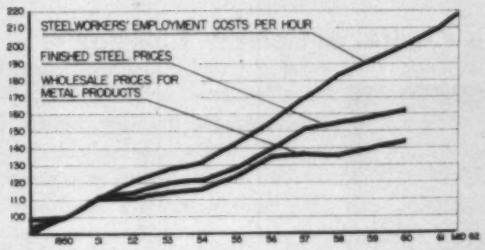
Ingersoll-Rand

Tools plus AIRengineering increase output per man

35A-8

STEEL LABOR COSTS SPUR INFLATION

(For all data, 1950 equals 100)

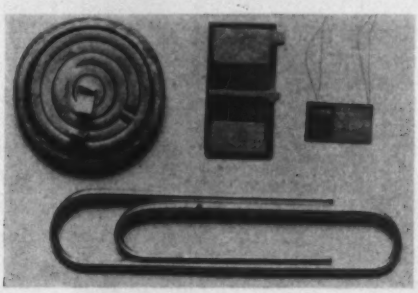


This chart compares the increases, since 1950, in steel labor costs, steel prices, and wholesale prices for metal products. It shows that each boost won by labor is followed by price rises in metalworking. Don't expect the latest steel labor contract to be an exception. Steel prices will eventually be raised and other manufacturers will follow suit.

How to Halt Inflation

Jack S. Parker, vice president, General Electric Co., points out: Any increase in wages or benefits is inflationary by the amount it exceeds the long term average gain in productivity for the economy as a whole—estimated to be a little over 2 per cent per year. Even if a company or industry can boost its productivity over the long term by more than the national average, excessive wage boosts granted by it will spread to other less efficient companies —goading the inflationary spiral. Leaders in productivity should help halt inflation by giving a better break to their customers, he believes. That would help to compensate for industries that fail to make substantial gains in productivity.

Molecular Electronics: What the New Concept Means



Look for a vast simplification of equipment, fantastic reduction in size and weight, greater reliability, and probably lower costs to result from a joint program of Westinghouse Electric Corp. and the U. S. Air Force (Page 48). The miniature components at left are one indication.

Coming Labor Study Will Show These Trends

Watch for a new Department of Labor study, due early this month, on the employment outlook for the soaring sixties. Highlights: The labor force will expand 18 per cent by 1970. Manufacturing employment will expand, reach-

ing perhaps 20 million (near the World War II level) by 1965. Professional and technical workers will show the biggest gain during the decade—42 per cent. Employment in services will rise 28 per cent; the proprietors and managers group will expand 21 per cent; skilled workers will increase by 21 to 22 per cent. Semiskilled ranks will be enlarged only 17 per cent and farm employment will drop 15 per cent.

Lease Boom in Capital Equipment Coming?

Yes, predicts Holmes H. Whitmore, executive vice president, Jones & Lamson Machine Co., Springfield, Vt. He says many metalworking companies are in dire need of more productive machines, but they don't have the necessary capital. In announcing his firm's new, lower cost, lease plan (Page 46), Mr. Whitmore points out that it may offer the customer a way to "have his cake and eat it too." He says leasing frees capital for research, development, and marketing needs.

Labor to Spearhead Tariff Protection Movement

Labor will probably demand U. S. tariff protection in the next few years. That's what Col. W. F. Rockwell, chairman, Rockwell Mfg. Co., told a National Industrial Conference Board meeting last week. He says U. S. industry is managing to survive the growing wage differential between the U. S. and other nations by investing in foreign plants, but labor will likely seek higher tariffs to protect its jobs.

Boating Is a $2.5 Billion Business

Look for retail sales of outboard boats, motors, and trailers to exceed $510 million this year—up 10 per cent from last year, predicts H. B. Atwater, president, Marine Products Div., McCulloch Corp. Mr. Atwater thinks sales will climb 160 per cent—to $1.3 billion—by 1970. Total U. S. spending for recreational boating now is $2.5 billion.

Industries Report Good Years

Resistance Welder Manufacturers' Association reports its members harvested $29.2 million worth of orders in 1959 vs. $20.9 million in 1958—a 40 per cent increase . . . Business failures in the U. S. last year totaled 14,053 vs. 14,964 in 1958, reports Dun & Bradstreet Inc. . . . Manufacturers of gas water heaters shipped 10.6 per cent more units in 1959 than in 1958, reports the Gas Appliance Manufacturers Association . . . Factory sales of home laundry

appliances increased 7 per cent in 1959 over 1958, reports the American Home Laundry Manufacturers' Association . . . The National Machine Tool Builders' Association reports total 1959 net new orders for cutting type machine tools equaled $509.4 million—up 81 per cent from 1958's $281.4 million.

Japan Wants Even More Liberal Trade Rules

Prime Minister Nobusuke Kishi of Japan appealed to the U. S. last week to liberalize restrictions against Japanese imports. He promised that Japan would take like action regarding U. S. imports. Japan must expand her world trade. She adds 1 million workers annually to an already underused labor force. Per capita income is now 30 per cent above pre-World War II levels, but many industries remain weak, claims the prime minister.

Abrasive Makers Step Up Research, Quality Control

If you use abrasive shot or grit, you can look for new materials, more engineering aid from your suppliers, and more uniform quality. It's the result of increasing emphasis that abrasive manufacturers are placing on research and quality control (Page 88). They're also expanding their plants to meet growing demand for metal abrasives. And they're developing materials and shapes for special jobs.

Carbuilders Use 1 Million lb of Aluminum Daily, Claims Alcoa

Expect automakers to use around 365 million lb of aluminum in 1960 model cars—81 million lb more than was consumed last year, says Aluminum Co. of America. The average GM car will use 54.8 lb (finished weight) this year—up 29.5 per cent from last year. Other averages: Ford Motor Co., 51.59 lb—down 14 per cent; Chrysler Corp., 82.45 lb—up 23.3 per cent; AMC, 48.85 lb—down 2 per cent; Studebaker-Packard, 17.85 lb—down about 5 per cent. Highest per car usages: Imperial (115.27 lb), Chrysler (114.38 lb), Corvair (103.36 lb), De Soto (95.05 lb), Lincoln (83.64 lb).

Aluminum Notes

Kaiser Aluminum & Chemical Corp. predicts that the average amount of aluminum used in building a house will reach 1000 lb by the end of this decade . . . Kaiser thinks the canmaking industry will use more than 50 million lb this year vs. 15 million last year . . . Aluminum Co. of America will restart an idle potline early this month at its Wenatchee, Wash., smelting works, boosting the company's operating rate 4 points to 86 per cent of capacity.

To Mars in Three Months?

Dr. T. C. Tsu, a Westinghouse Electric Corp. research engineer, told the American Astronautical Society that a space vehicle could reach Mars in

about three months instead of the nine months "normally" considered. His plan calls for a straight line path of flight. It requires that a space ship take off from an orbit around the earth and be powered continuously. Motive power would come from either a solar sail (which uses the pressure of sunlight acting on a thin reflecting surface) or an electric propulsion system. "The plan appears possible with our present knowledge," says Dr. Tsu.

GSA to Sell California Property

The General Services Administration announced plans to sell the former Manteca (Calif.) Magnesium Metal Plant, built during World War II for around $7 million. The plant is served by a railroad; dock facilities are nearby. Included are 17 buildings, over 80 acres, and magnesium producing equipment. GSA will accept bids until Feb. 24. To be sold separately are 46 industrial tractors, lab equipment, and a propane plant.

Industry's Pirates Get Ethics

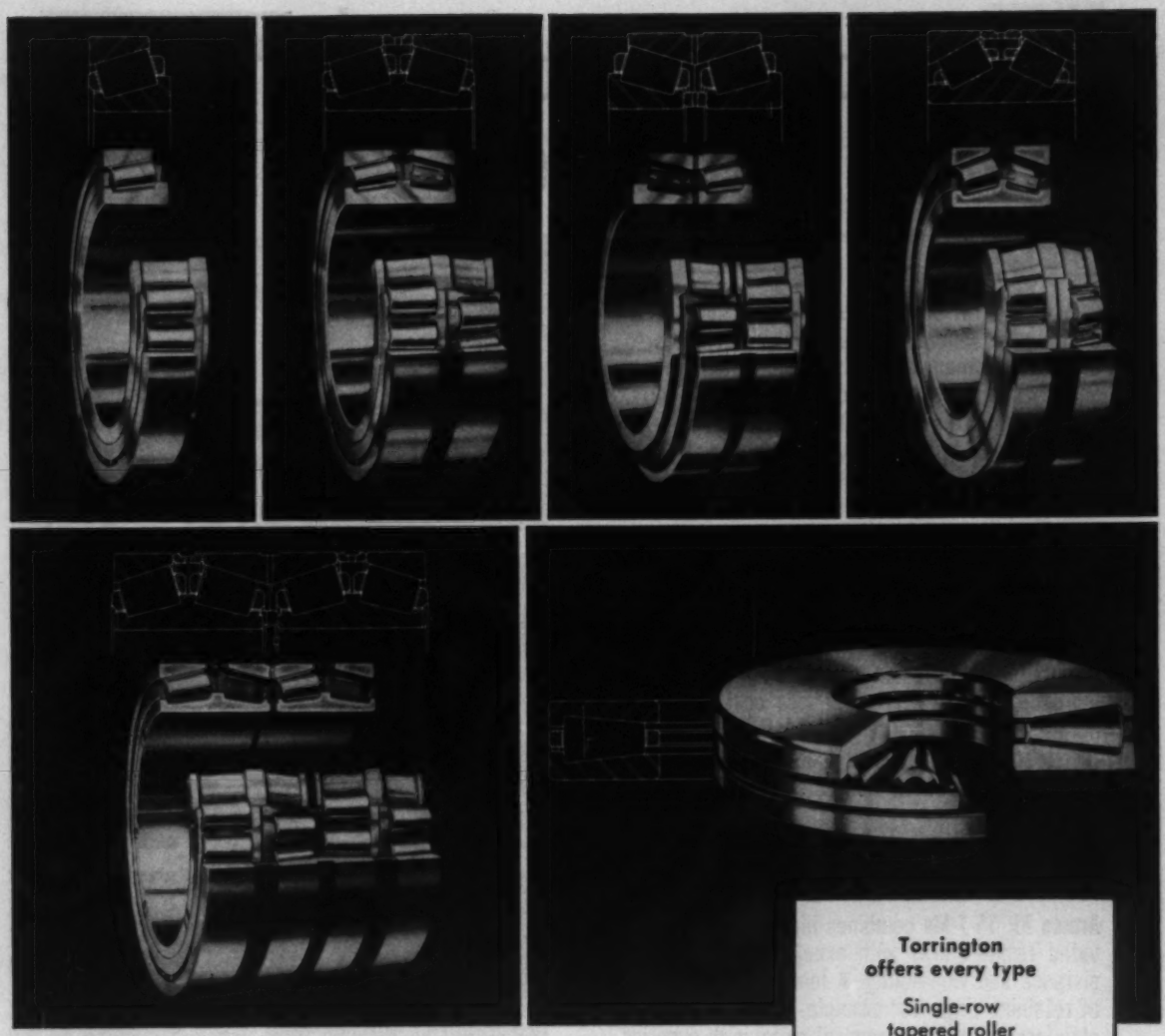
A group of executive recruiting firms have formed the Association of Executive Recruiting Consultants. Goal: Develop, maintain, and enforce ethical practices among executive recruiting organizations. Today's severe shortage of men qualified to fill executive posts led to questionable practices which brought about the formation of the group. The prospect: Expect pirating to continue but on a more ethical basis.

Heavy Construction High in '59

Heavy construction contract volume last year ($20.3 billion) was the second highest in history, reports *Engineering News-Record.* Strongest spots were industrial building (up 70 per cent from '58), private mass housing (up 26 per cent), commercial building (up 20 per cent), and waterworks (up 22 per cent). Weakest areas: Public mass housing (down 46 per cent), highways (down 23 per cent), public bridges (down 21 per cent), earthwork, dams, and waterways (down 13 per cent). The Commerce Department estimates total new construction last year reached a record $54.3 billion.

Straws in the Wind

Expect Federal Reserve Board action on raising the discount rate—now 4 per cent—to be put off until at least mid-February . . . Personal income hit a record $380.1 billion last year—up $21.1 billion from '58; expect this year's total to exceed $400 billion . . . IBM has put its latest—and most powerful—electronic computer on the market; the transistorized 7080 will sell for $2,528,000 or rent for $55,500 a month. It'll handle inventory control and like jobs up to ten times faster than the 705, says IBM . . . The average capital invested per production worker in U. S. manufacturing industries declined to an estimated $17,800 during the first half of 1959 from a record $17,900 in 1958, reports the National Industrial Conference Board . . . U. S. iron ore resources total about 75 billion long tons (crude ore), estimates the Geological Survey. Of that, about 10 billion tons are usable under existing economic and technological conditions . . . The Lorain (Ohio) works of U. S. Steel's National Tube Div. set a new industry safety record when it passed the mark of 8,260,000 manhours without a disabling injury on Jan. 21 . . . Armco Steel Corp. has introduced a new type of iron that requires only one coat of porcelain enamel for finishing.



Torrington offers every type

Single-row tapered roller

•

Two-row tapered roller, solid cone

•

Two-row tapered roller, solid cup

•

Steep angle, two-row tapered roller

•

Four-row tapered roller

•

Conical roller thrust

•

Patterned for performance... Torrington Tapered Roller Bearings

Torrington Tapered Roller Bearings are made to virtually every design pattern for your particular performance requirements.

There are single-row, double-row... four-row tapered roller bearings—all in regular or steep angle design for radial and thrust loads—and conical roller thrust bearings for heavy thrust loads. Each is designed for dependable service in its operation.

Whether your application calls for a catalog bearing, or one custom-built to your specifications, you can rely on Torrington for utmost precision of manufacture, quality material, advanced metallurgy... and engineering experience based on the manufacture and application of every major type of anti-friction bearing. **The Torrington Company, South Bend 21, Ind.—and Torrington, Conn.**

TORRINGTON BEARINGS

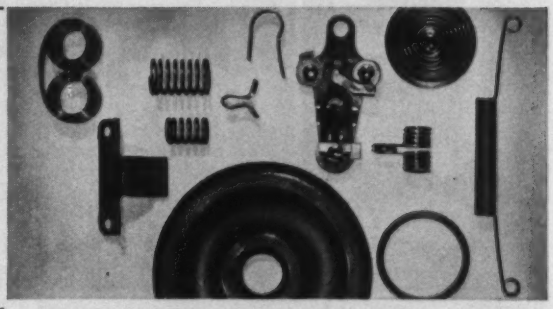
Every Basic Type of Anti-friction Bearing

TAPERED ROLLER • SPHERICAL ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • NEEDLE ROLLERS • THRUST

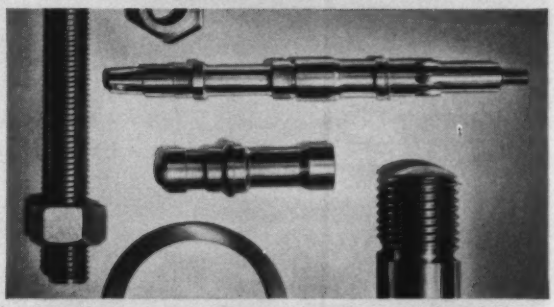
Special Armco Stainless Steels Point Way to Better Products

New steels are born at Armco

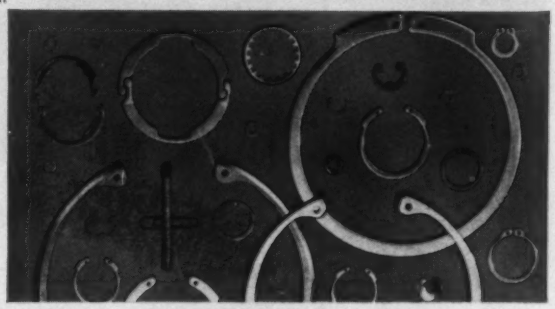
Armco 17-7 PH offers strength, corrosion resistance and excellent fabricating characteristics to designers of many products—from watch springs and saws to electrical switches and aircraft parts. Tensile strengths to 350,000 psi, plus ability to resist heat and corrosion, make it especially useful for springs.



Armco 17-4 PH is specified extensively for shafts, fasteners, valves, and other applications where its strength and corrosion resistance mean longer, more dependable service at less cost. The high hardness and durability of 17-4 PH combine to resist corrosion-fatigue and abrasion. Its simple 900 F heat treatment also cuts production costs.



Armco PH 15-7 Mo combines high strength at elevated temperatures with excellent corrosion resistance and workability. A leading manufacturer of retaining rings, for example, found this special stainless steel an economical metal with superior properties in severe service. As a result, existing ring applications have been greatly expanded and entirely new fields developed.



For more information on Armco Precipitation-Hardening Stainless Steels, mail the coupon.

ARMCO STEEL CORPORATION, 1200 Curtis St., Middletown, Ohio

Send me information on these special Armco Stainless Steels

☐ 17-7 PH ☐ 17-4 PH ☐ PH 15-7 Mo

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ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation

Why Another Recession?

Too many people have the notion that the prosperous bloom of 1960 will fade away quickly into another recession similar to those in 1949, 1954, and 1958.

Business will not go to pot, they say, but we will go through a period of inventory adjustment which may be evident as early as the end of 1960 or as late as the fall of 1961.

Whatever the timing, a recession is being generated right now by excessive purchases of materials not needed for current production and a buildup in inventories of semimanufactured and finished products.

As a common denominator example, let's take steel:

In prosperous 1953, finished steel shipments totaled 80 million tons. In 1954, a recession year, they dropped to 63 million tons.

During the inventory buildup, finished steel shipments were at the high levels of 84.7 million tons in 1955, 83.2 million in 1956, and 79.8 million in 1957. In 1958, another recession year, they dropped to 59.9 million.

The 116-day strike, of course, prevented an accumulation of steel in 1959. Shipments were only 68 million tons, yet consumption remained high.

As a result, consumers' inventories dropped from an estimated 26 million tons on June 14 to 8 million on Nov. 9.

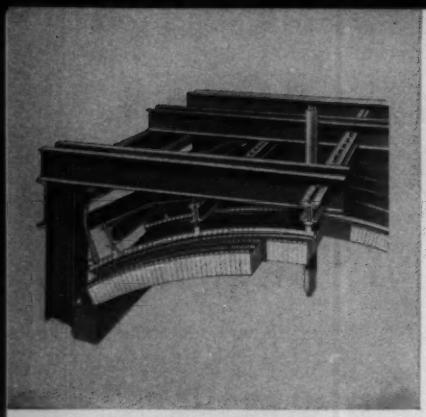
The way 1960 is shaping up, 14 million of the 97 million tons of finished steel shipped will go into inventories.

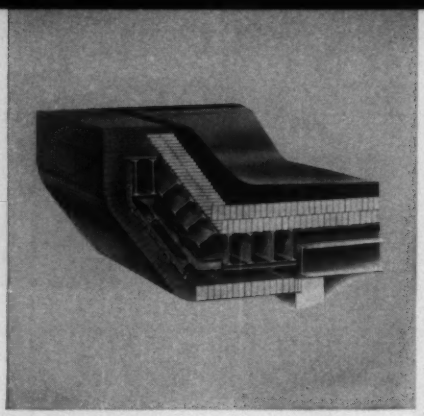
Multiply the situation typified by steel a thousand times and you have the makings of a fourth recession in little more than a decade.

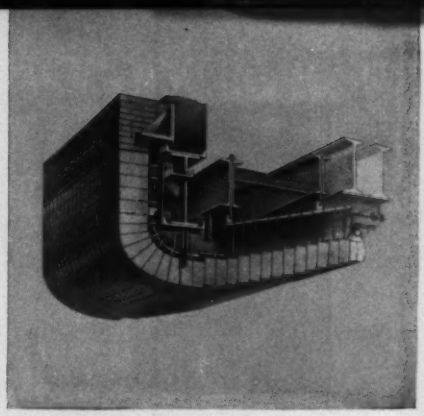
Such recessions with their attendant disruptions in production are costly and unnecessary.

Let's not work ourselves into another one!

Irwin H. Such
EDITOR-IN-CHIEF







① HELD-UP, HELD-DOWN ROOF

- No roof centers to install.
- Easily hot-patched—Brick layers do entire job. No welding, no cutting.
- Pipe-supported—No special supporting members required.
- Inexpensive hangers—Simple, one-piece wire.
- Standard wedge brick—Wider bearing surfaces. More stability.

② INTERCHANGEABLE SUSPENDED CHILL WALL

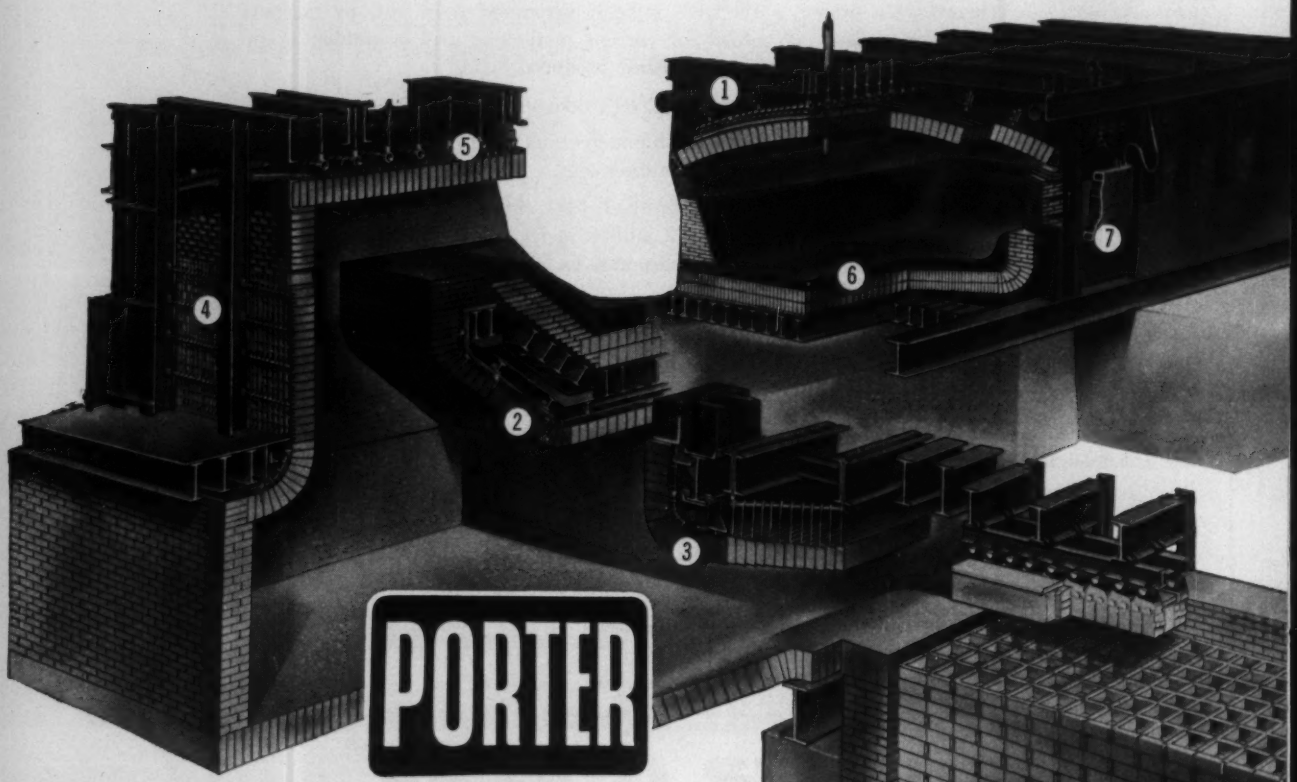
- Low cost, simple installation—Adaptable supporting structure.
- Greater expansion flexibility—Tile engaged on bed joints.
- Safe load distribution—Self-supporting castings.
- Tightly sealed joints—Tongue-and-groove clay tile.

Brick recommended: Either MC-70 Cladex or interchange with Peerlac, 60% alumina.

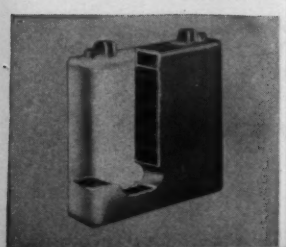
③ INTERCHANGEABLE FAN TAIL

- Pipe-supported—Easily replaced with standard mill supply stock.
- Low-cost, simple installation—Adaptable supporting structure.
- Greatest strength—Fabricated steel nose supports.
- Higher heat resistance—Alloy hangers.
- Tightly sealed joints—Tongue-and-groove clay tile.

Brick recommended: Either MC-70 Cladex or interchange with Peerlac, 60% alumina.



PORTER

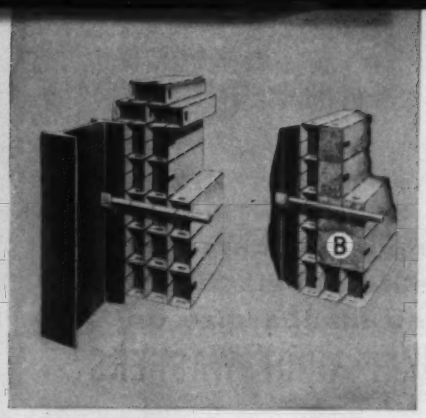


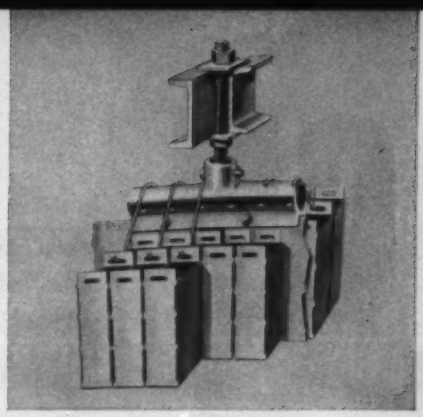
⑦ WATER COOLED OPEN HEARTH DOOR

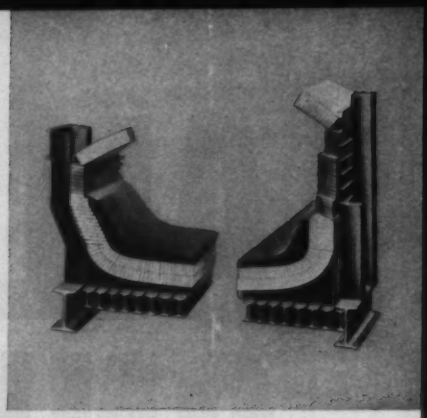
- Long life—Easily installed, easily replaced.

Recommended: Porter Plastikrom for door lining.

* Patents applied for
† T.M. applied for







4 ENDWALL CONSTRUCTION

- Air-cooled tabs (4 sides of brick)—More heat conduction for more efficient cooling.
- Refractory reinforcement for hot spots—Extended casings* permit adding refractory material on cold face (B) as hot face wears.
- Cladding with Porter Cladex†—Dimpled construction of casings provide mechanical spacing for expansion.
- Basic strength—Porter construction eliminates need for tie plates.
- Ties and pipe easily reclaimed.
- Simple one-piece hangers—Wall can be dismantled without cutting or burning.

Brick recommended: MC-70 Cladex or other specified chrome and magnesite compositions.

5 AIR CLEANED, AIR COOLED*, TAB SUPPORTED ROOF BRICK

- Built-in air cleaning—Covers entire roof. No hand blowing.
- Controlled cooling over any area—for controlled wear.
- Tab support—Simple, inexpensive.
- Air-cooled tabs—More heat conduction for more efficient cooling.
- Positive support—Tie plate anchored to pipe.
- Inexpensive hangers—Simple, one-piece wire.
- Notched tie plates—Slip into place. Easily installed or replaced.

Roof brick recommended: CM-40R Cladex or other specified chrome and magnesite compositions.

6 HEARTH CONSTRUCTION

- Monolithic subhearth—Formed by Subhearth Kromform. Easy to install. Perfect conformation.

Brick recommended for inverted arch bottom: Porter M-90B, or other specified chrome and magnesite compositions.

Ramming mix recommended for working bottom: Porter Magnaram 95 for highest MgO content. Or Magnaram 85.

Brick recommended for back wall: MC-70 Cladex. Also other burned and unburned chrome and magnesite compositions.

Brick recommended for front wall: MC-70 Cladex in standard and special jamb brick. Also available burned or unburned chrome and magnesite compositions.

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both suspension and refractories by Porter

It's here in detail . . . the Porter All-Basic Open Hearth!

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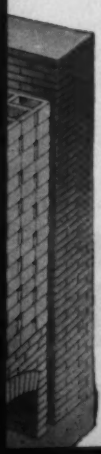
The suspension system and the basic refractory materials are designed to work together . . . no guesswork regarding either. There is no division of responsibility; Porter is your complete source.

For more information write *Refractories Division, H. K. Porter Company, Inc., Porter Building, Pittsburgh 19, Pa.*



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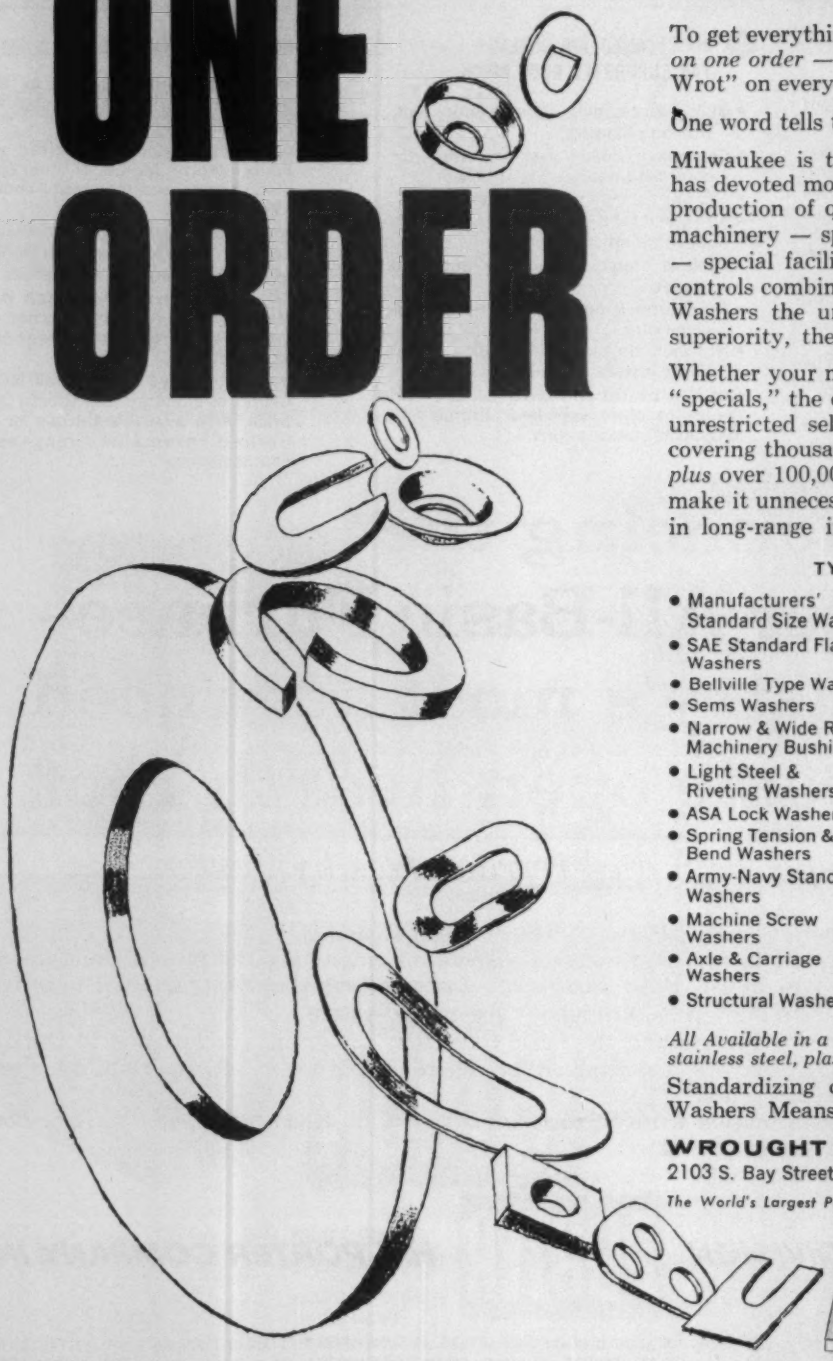

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- Spring Tension & Wave Bend Washers
- Army-Navy Standard Washers
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- Countersunk Finishing Washers
- Flat & Bevel Square Washers
- Drawn Center Washers
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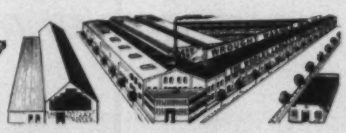
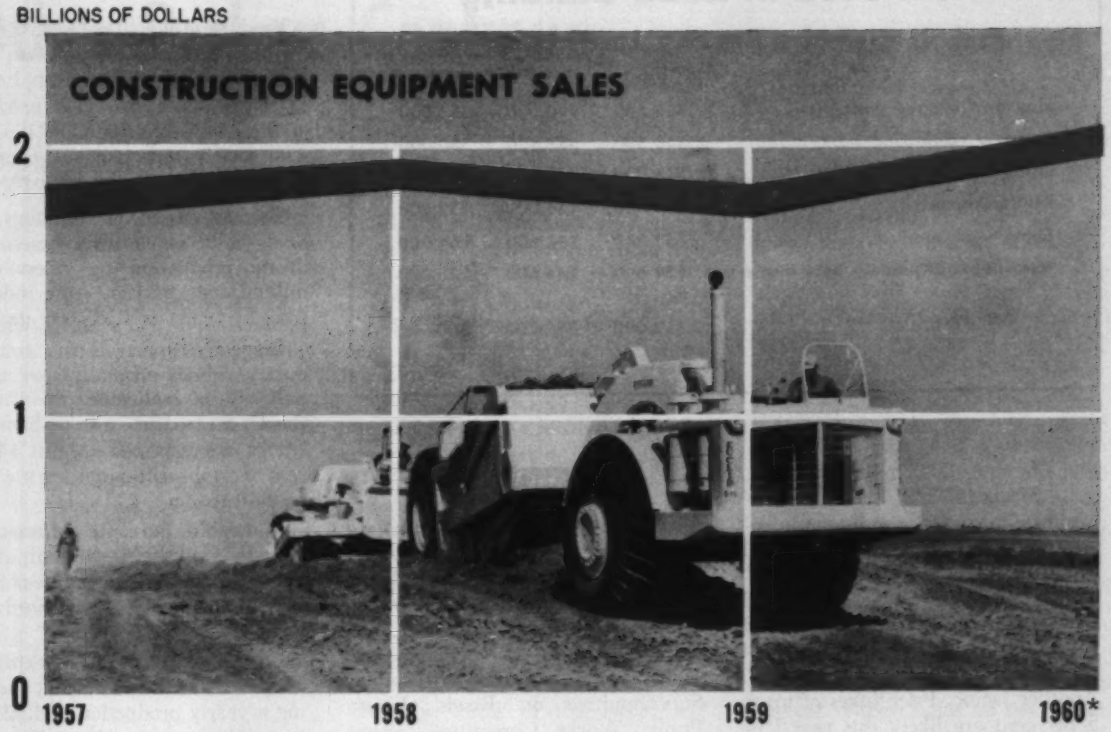




Source: Business & Defense Services Administration.
*Estimated.

Euclid Div., General Motors Corp.

Construction Equipment Sales Turn Up

CONSTRUCTION EQUIPMENT sales this year should rise to the $2 billion mark, despite a slight dip in expenditures for the federal highway program.

Outlays for road building will be about $5.7 billion compared with 1959's record $5.8 billion, estimates the Commerce Department.

The equipment makers base their optimism for a $2 million sales rise (see chart) on two factors:

1. "There's a need to rebuild dealer inventories which fell when some equipment makers had to shut down due to material shortages created by the steel strike last year," says Caterpillar Tractor Co.

2. The industry is rapidly improving on equipment to boost its efficiency and productivity—in response to growing concern of construction officials over rising costs.

First half sales of equipment are expected to be well above those of the second half. Rapid recovery of the steel industry is cutting down the possibility that steel shortages will affect production, reports Allis-Chalmers Mfg. Co.

Oliver Corp. and Euclid Div., General Motors Corp., are two that see product innovation as a key to higher sales this year. Oliver has brought out a new line of crawler tractors. Euclid's large tractor features a separate engine for each crawler track. The design is expected to ease operation and lower maintenance costs.

• **Better Equipment**—The industry and its suppliers are teaming up to improve interchangeability and horsepower to weight ratios. Use of high strength alloy steels is increasing. Automatic transmissions are being installed on more equipment.

Equipment makers foresee these possibilities: Individual wheel operation and remote controls which will permit one man to operate two or more pieces of equipment at a time.

The long range outlook is bright. Tie in the tremendous population growth with the increase in two and three car families, and it's apparent the highway needs of the future are great, observe International Harvester Co. executives.

• **Optimism Tempered**—But some equipment builders see bumps along the way. Explains one: "Sales

Steel Used in Road Building

(Tons consumed)

	1960	1959	1958
Structural shapes and piling	864,800	940,000	880,000
Concrete reinforcing bars	540,500	587,500	550,000
Plates	324,300	352,500	330,000
Reinforcing mesh	129,720	141,000	132,000
Other wire products	151,340	164,500	154,000
Miscellaneous (mainly bars and pipe)	151,340	164,500	154,000
Totals	2,162,000	2,350,000	2,200,000

could be hurt this year because contractors will wait until the federal highway program is finalized. Rather than investing in needed new equipment, they'll be satisfied to fix up the old machines until the Washington hassle is settled. Another factor: Price hikes of up to 5 per cent are likely this year," he predicts.

• **Costs Spiral**—The financial dilemma of the federal highway program was the feature topic at the convention of the American Road Builders Association in Cincinnati, recently.

"With the advantage of hindsight, we can see some shortcomings in the highway financing plan," comments Maj. Gen. Louis W. Prentiss (ret.), executive vice president of the ARBA. "When the 41,000 miles federal highway program was set up in 1956, it was estimated that the interstate road network would cost $27 billion. That estimate has now been pushed up to $40 billion."

Strain on the over-all program stems from the Byrd Amendment (designed to keep it on a pay as you go basis), increasing construction costs, the $2 billion in obligations carried over from prior road programs, and the emergency highway program enacted in 1958 to combat the recession.

• **Help on the Way** — President Eisenhower was able to push through a 1 cent federal gasoline tax increase last September. After it expires in mid-1961, it will be replaced by revenues from excise taxes on cars and accessories.

Rep. Gordon H. Scherer (R., Ohio) ranking minority member, Subcommittee on Roads, House Public Works Committee, urges: "The job must be done without deficit spending. Let's have the courage to pay for the program, even though it may mean broadening the tax base."

Other sources of revenue are under consideration. One suggestion is to use some of the Defense Department's appropriations since the interstate highways are part of the national defense setup (they're being built to accommodate defense vehicles).

Some factions are calling for a cutback in the road program. Highway officials point out that the nation can't afford a cutback for two reasons: "Highways are already inadequate," they claim, and "the longer we delay, the more the highways will cost in the long run."

• **1961 Will Tell** — Consensus of equipment builders, government and highway officials on the outlook: Nothing will be done this year because of the elections. Neither talk of deficit spending nor boosting taxes make good campaign issues. Most officials are pinning their hopes on constructive action in 1961.

Big Year Ahead for Malleable Iron Castings

Producers of malleable iron castings are looking forward to their best year since 1955, reports Lowell D. Ryan, executive vice president of the Malleable Founders' Society. The society represents 51 members —three-fourths of the industry.

Forecast based on backlogs and analyses of major market areas indicate production in excess of 1 million tons in 1960—the industry record (1955) is 1,105,000 tons.

Biggest customer is the auto industry, which normally uses about half of the malleable produced in the U. S. In 1960, automobiles and trucks are expected to use 14 per cent more pearlitic and ferritic malleable castings.

Malleable parts in automobiles include crankshafts, differential carriers and covers, steering gear housings, joint yokes, door hardware, transmission gears.

Over-all, the industry expects a 12 per cent rise in output, indicating a yearly production of 1,023,000 tons. Consumption by railroads is expected to increase by 32 per cent; machinery, including electrical, will call for an 11 per cent increase.

Manhour Output Up 3.5%

Output per manhour in the private sector of the U. S. economy has risen at an annual rate averaging between 3.1 and 3.5 per cent since 1947, says the Labor Department.

Annual changes, ranging from nearly zero in some years to 8 per cent in others, showed above-average gains came in periods of economic expansion while below-average gains occurred in periods of stable or declining activity.

In a new report covering the last half-century, the bureau shows that output per manhour nearly tripled from 1909 to 1958 for an annual increase averaging close to 2.5 per cent. The report also discusses such economic factors as advances in technology, plant and equipment per worker, electric energy used per manhour and the growth of clerical, professional, administrative, and other nonproduction workers in manufacturing.

Acme Steel, USW Sign Pact; Other Parleys Continue

UNITED STEELWORKERS went on strike at Acme Steel Co. at midnight last Tuesday to force company officials into signing a contract. Settlement was reached Wednesday morning.

The settlement included company acceptance of a 2B type working practices clause, the major stumbling block in the Chicago steelmaker's negotiations. Its previous contract did not contain the clause.

The USW action followed a National Labor Relations Board election the previous week in which the company's last offer was turned down 1971 to 266.

Acme Steel's walkout was the only one called by the union following NLRB elections in four companies and expiration of the Taft-Hartley injunction on Tuesday night.

In all elections, the company offers were turned down. Workers at Pittsburgh Steel Co. voted 4760 to 2458; at Joseph T. Ryerson & Son Inc.'s six plants the vote was 340 to 24; at Moltrup Steel Products Co., Beaver Falls, Pa., the vote was 178 to 13.

Contract extensions with a five day notice provision for either side to terminate were agreed upon at Pittsburgh Steel and Ryerson. Moltrup negotiations were continuing under a 24 hour notice for termination provision.

Bargaining teams at Pittsburgh Steel were still wrestling with the incentive problem. The company reports that its incentives have boosted its employment costs 46 cents per hour above the industry average.

Moltrup Steel's offer on which the workers voted was to renew its former contract, reports H. O. Zuberbuhler, vice president. He states that his company can't afford the terms of the basic steel settlement.

The issue in the Ryerson negotiations, reports Hardie Beck, manager of the Pittsburgh service center, is over the length of the contract. Ryerson wants to push its contract expiration date two months beyond that of the steel settlement.

Titan Base Underground

Some 66,000 tons of steel products will go into the first U. S. underground missile base (to be built near Denver), says the American Iron & Steel Institute.

The installation, Lowery Air Force Base, will consist of six subterranean sites scattered over 875 acres and will house three armed Titan ICBMs in steel and concrete silos more than 150 ft deep. The silos will be sealed with heavy steel doors to safeguard the launching sites against anything except a direct atomic hit. Construction will include 28,000 tons of reinforcing steel, 12,000 tons of structural shapes and plates, 10,000 tons of corrugated steel tunnel liner, and 10,000 tons of steel pipe.

Tungsten Mill Planned

A $5 million ore mill will be set up near Watson Lake, on the British Columbian-Yukon border, for the processing of tungsten, announced Karl J. Springer, Vancouver, B. C., mine developer who also is president of Pacific Western Airlines.

GM, Alcoa Sign Hot Metal Contract

GENERAL MOTORS CORP. has signed a hot metal contract with Aluminum Co. of America to supply the Fabricast plant of its Central Foundry Div. at Bedford, Ind., with molten aluminum.

The contract, which was let on a bid basis, is significant for three reasons:

1. It's the first hot metal contract that a U. S. automaker has signed with an aluminum producer other than Reynolds Metals Co. Reynolds has similar contracts with GM plants in Jones Mill, Ark., and Massena, N. Y., and with a Ford Motor Co. foundry near Listerhill, Ala.

2. The Alcoa metal will be hauled 100 miles compared with less than 5 miles for the contracts held by Reynolds. Aluminum industry sources say Alcoa will ship the metal in crucible tank trucks which can keep it hot up to 8 hours. Estimated hauling time is 4 hours.

3. Rumors keep cropping up that the auto firms aren't altogether happy with the hot metal deals: They have to take the quantities of aluminum contracted for regardless of ups and downs in business, and the hot metal has to be alloyed. That creates some problems.

GM's new contract calls for trucking the molten aluminum from Alcoa's $80 million smelter near Evansville, Ind. Construction on this plant started in July, 1956, was halted, and not resumed until last November. Eventual capacity of the plant will be 150,000 tons, although only a single potline will go into operation this spring with a capacity of about 25,000 tons, most of it going to the GM plant.

GM's Fabricast plant makes aluminum brake drums for Buick, aluminum housings, and a dozen other parts.

It has facilities for sand, permanent, and semipermanent molding and diecasting of aluminum. Built in 1942 to supply GM's Allison Div. with aluminum cylinder heads for aircraft, it became part of the Central Foundry Div. last year.

Look What's Happening to Electronics

ELECTRONIC EQUIPMENT as we know it today will undergo radical change—if achievements in a joint program by Westinghouse Electric Corp. and the U. S. Air Force are an indication.

They are hard at work developing molecular electronics, a new concept in electronic systems which will mean: A vast simplification of equipment; a vast reduction in size and weight; a big increase in reliability; and a probable big cut in costs.

Molecular electronics makes it possible for a piece of metal smaller than a dime to do the job of a complicated mass of wiring that would fill a box as big as the case of a table model radio.

Westinghouse and the Air Force report that molecular electronic units already developed are more reliable and only one thousandth the size of the most advanced electronics devices in use now. The increase in reliability stems from the drastic reduction in the number of parts used and the almost complete elimination of connections.

Dr. S. W. Herwald, Westinghouse vice president-research, says it isn't difficult to foresee development within a few years of a complete communications receiver the size of a pea.

The buttonlike piece of metal the girl is holding with tweezers is an amplifier that does what the conventional amplifier on the table will do

• **What It Means**—For suppliers to the electronics industry, molecular electronics means a loss of markets for wiring, printed circuits, resistors, tubes, transistors, transformers, fasteners, chassis frames, cabinets, and related items.

For metalworking companies that incorporate electronic devices into their products, the development promises design and equipment simplification and a way to cut production costs.

• **Timetable**—First use (probably in three to four years) of molecular electronics will be in missiles and satellites (where small size, light weight, and reliability are paramount), Dr. Herwald believes.

Next, he predicts, will be the extension of molecular electronics to land based military equipment, and ultimately to commercial and industrial applications.

Col. W. S. Heavner, USAF, chief of the Wright Air Development Division's Electronic Technology Laboratory, Dayton, Ohio, says that "it appears that the majority of present day military electronic equipment requirements can be satisfied with molecular electronics." But "as revolutionary and dynamic as this new technology seems to be, it probably will not replace all of the present conventional electronic component parts," Colonel Heavner adds.

So promising is molecular electronics that the Air Force hopes to find ways for it to contribute to bioelectronics—the ability to simulate the superior biological capabilities found in the animal kingdom. "For instance," says Colonel Heavner, "we may be getting a step closer to duplicating the magnificent performance of the human brain."

• **What It's Based On**—Molecular electronics makes use of phenomena occurring within or between domains of molecules in the solid state.

In the concept of molecular elec-

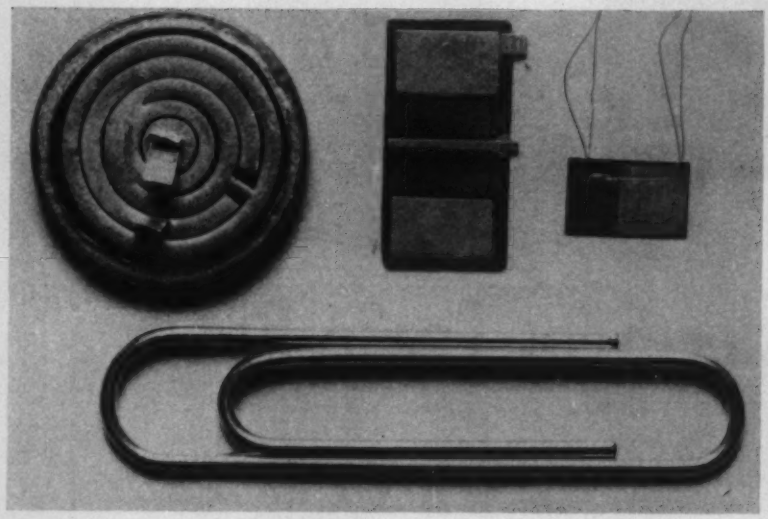
tronics, no use is made of the traditional circuit-and-component approach to electronics. "Instead, the objective," Dr. Herwald explains, "is to use our knowledge of the structure of matter to synthesize monolithic function blocks whose arrangement and composition permit each to serve as a substation to perform an electronic function in the control or transformation of energy."

The joint Westinghouse-Air Force program has already developed eight classes of function blocks to demonstrate the feasibility of molecular electronics at frequencies ranging from infrared to direct current.

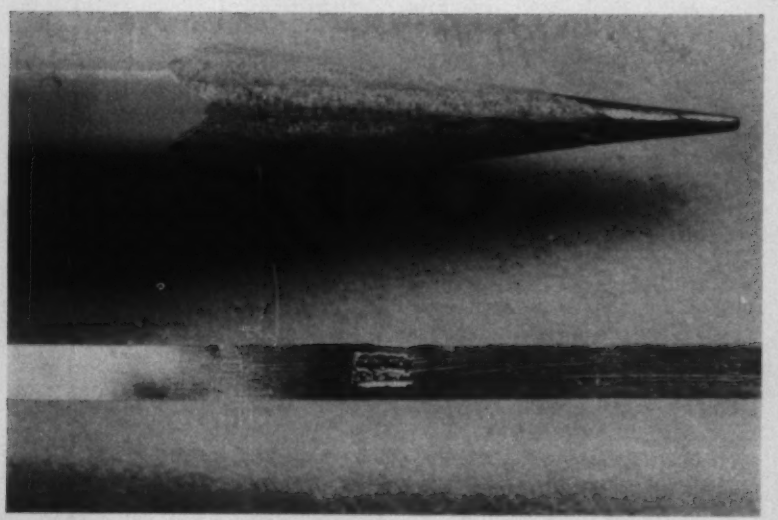
• **How It's Done**—In pursuing the molecular electronics concept, you first determine the desired electronic functions to be performed and then build these functions into a single piece of semiconductor material, such as silicon or germanium. By such techniques as diffusion, plating, electron beam machining, etching, cutting, radiation, alloying, and photographic processes, the structure of the tiny solid piece is arranged to perform the functions that until now have required many individual components which have had to be soldered together. Additional processing steps are required to encapsulate the block, protect it against shock and vibration, and make it stable under conditions of temperature and radiation it will encounter.

The semiconductor material is produced by the dendrite process (announced several months ago) in which ribbons about ⅛ in. wide and a few thousandths of an inch thick are drawn from a molten mass. It is essentially a continuous process in which the ribbon grows 6 to 12 in. a minute in the precise direction of crystal growth desired.

Dr. Herwald says that "it is probable that we will eventually be able to 'grow' from a pool of molten semiconductor materials some items of electronic equipment that today are as complex as radio receivers and amplifiers."



The device with concentric arcs is an audio amplifier. Next to it is a free running-multivibrator. The other device is a two stage video amplifier



Semiconductor crystals are "grown" in the form of long, thin, near perfect ribbons which provide the basic building blocks of the new system

Electronic Imports Jump

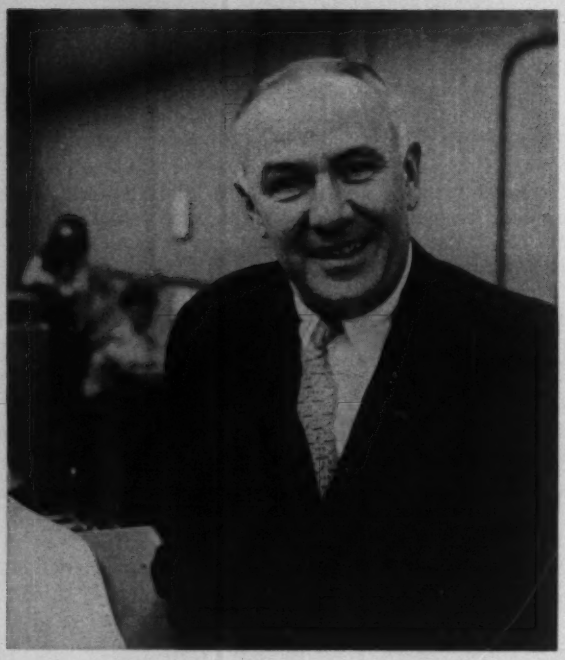
While U. S. exports of electronic products declined during the first nine months of 1959, imports ($48.8 million) were more than double what they were in the like 1958 period, reports the Commerce Department.

Imports of radio apparatus and parts from Japan were valued at $43.3 million vs. $3.4 million in the like 1955 period. Other big exporters of radio receivers are West Germany, the United Kingdom, and the Netherlands.

Fringe Costs Up 200%

U. S. private industry paid an estimated $15.4 billion in 1959 for pension, welfare, and unemployment benefits, reports the National Industrial Conference Board. The payments, which increased by $1.6 billion between 1958 and 1959, accounted for 6.8 per cent of total employee compensation last year.

Total payments for employee security climbed 208.2 per cent in the ten years following 1949, says the board. The steepest increase was in the outlay for private pension and welfare funds, which last year stood 280.4 per cent above the 1949 level.



"Unless solutions are found to (some of) industry's problems, it is our firm conviction that manufacturers . . . will turn to leasing on a mass scale to modernize and expand production." Anticipating the need, Jones & Lamson's Holmes H. Whitmore explains his company's new lease plan designed to help customers overcome dollar restrictions on equipment buying

Builder Sees Lease Boom . . .

SHORTAGE of after-tax capital may turn many metalworking companies to leasing as a principal method of acquiring modern production facilities.

Holmes H. Whitmore, executive vice president, Jones & Lamson Machine Co., Springfield, Vt., expresses that opinion. He adds: "The metalworking industry is confronted with a shortage of the funds required to modernize or expand. Even the largest companies are attempting to conserve their capital to cope with the increasing cost of raw materials and labor. If excess capital is available, most managers have many good applications for it, in addition to the needed investment in equipment."

• **Problem Sources** — Contributing to the shortage, says Mr. Whitmore, is the squeeze of higher labor and raw materials costs, and federal tax laws that impede investment. Mr. Whitmore specifically cites the restrictions on rates of depreciation and tax life of equipment.

Yet, despite those deterrents, he says, "there is the basic fact that economic forces are requiring the industry to increase productivity." Jones & Lamson's new lease plan is tailored to help.

Mr. Whitmore estimates that it would take some $5 billion just to replace the machine tools that are more than 15 years old. With the current rate of technological development, many younger machines also ought to be moved out in the interest of productivity, he asserts.

• **A Solution** — Leasing seems the ideal solution to the dilemma of a manager who has need for equipment, but an inadequate amount of capital for acquisition. Jones & Lamson's management concludes that, to date, leasing has fallen short of the goal planned for it.

Evaluating the results of a six month study of available lease plans (including their own), management decided a new, more liberal lease plan was needed. Normal lease plans, they felt, required security payments that could be too steep, particularly for managers of small plants. Also, traditional lease rates might be high enough to make the contracts too expensive, even though lease advantages were attractive.

To alleviate some of the drawbacks, and to get off to a running start in the boom, Jones & Lamson's management has announced a new Profitivity Lease Plan (see opposite page).

Its goal: Contracts in which all payments can be made with dollars earned by the leased equipment—calling for no undesirable cash flow at any time.

• **The Lease Market**—Mr. Whitmore candidly admits that the new plan is designed to make it easy for customers to acquire machine tools made by his firm. "Let's remember that we are in business to sell machine tools." He calculates that the easing of several lease requirements

Here's the Plan . . .

WITH its new lease plan, Jones & Lamson Machine Co., Springfield, Vt., hopes to provide customers with a way to get modern production equipment, and to pay for it entirely out of the dollars earned by the equipment.

One of the key features: If ancillary equipment is needed to complete the modernization of a production line, Jones & Lamson will arrange to have the equipment (even if made by other equipment makers) included in the contract at the same lease rate.

Other features of the plan that are expected to make it popular:

- No security deposit or other initial payment is required. The first monthly payment is not due until 30 days after shipment.

- Leasing rates are set low enough (bank rates) so it may be more advantageous to use capital for other purposes. On the normal five year contract, for example, the monthly payment is $20.50 for each $1000 of equipment value. (See sample below.) Over the normal lease period, the total payments equal 123 per cent of the equipment value.

- The plan is a true lease. The user at no time takes title to the equipment. That means he can take full advantage of tax provisions.

- The lease may include expendable items and special tools required for Jones & Lamson equipment.

- The lessee is responsible for maintenance and repair of equipment, but he will have no obligation involving ownership risks other than insurance coverage.

- When a five year lease period is completed, the lessee may turn back the equipment with no further obligation, or he may continue the lease at one-third of the original monthly rate.

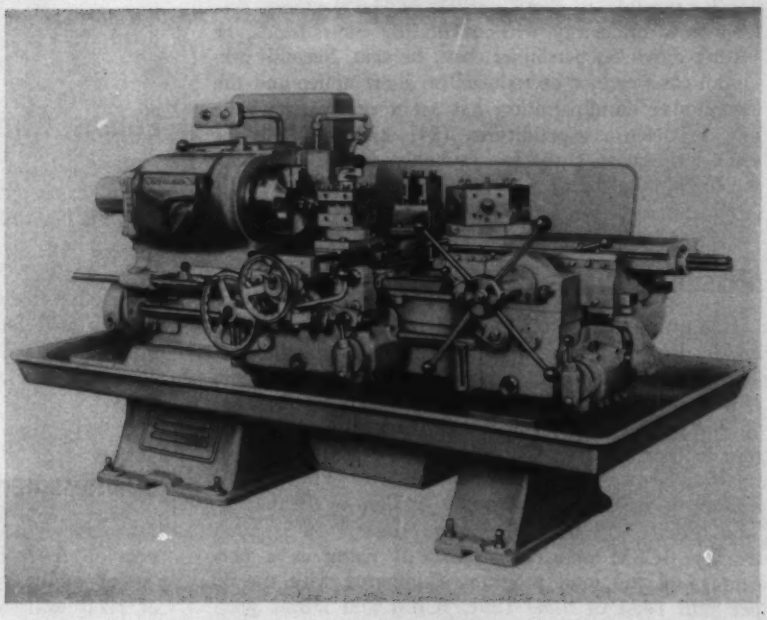
Initiates New, Low Cost Plan

will help his company's salesmen and distributors get more machines into customers' plants.

Success seems certain. Within a week of the time the sales staff was first told about the new plan, four contracts were signed. A field test of the plan (checks for customers' and prospects' thoughts and reaction) showed considerable user enthusiasm for the terms of the plan.

Small plant operators, with relatively little available capital, may be the first to take advantage of the contract that calls for no initial capital outlay. But even the managers of large corporations are attracted to this feature. Often, they have the capital required, but with leasing they can use the money for research and development or for a dozen other needed improvements.

Jones & Lamson managers are optimistic about the success of the plan. Based on reaction over a few weeks, one of them estimates the plan will add at least 20 per cent to the firm's 1960 orders.



$510 a month is what this standard turret lathe would cost on a five year lease contract. After the contract has terminated, the machine could be retained by the user for $170 a month

Cutbacks in Defense Hardware Hinted...Polaris, Minuteman Plans Revealed...Atomic Hearings Set...Tax Reform, if—

Warns Rising Costs Can't Continue

LOOKING ahead to future Defense Department budgets, Defense Secretary Thomas S. Gates Jr. sees higher budgets, but definitely warns that personnel, operation, and maintenance costs must be watched closely. He estimates the fiscal 1961 budget calls for $22.5 billion to be spent on those categories compared with an over-all budget of $41 billion. In other words, defense overhead costs must be cut somewhere to allow the department to spend increasing amounts on hardware and on research and development of new weapons.

He threw out a hint last week of further cutbacks or stretchouts in current hardware programs: It will not be possible to carry out all of the weapons systems now underway without finding more funds, or cutting down on personnel costs, he said. Because personnel costs cannot be reduced on short notice and the Eisenhower administration has set a pretty firm ceiling on defense expenditures ($41 billion), look for some important cutbacks, probably before June 30, the end of fiscal 1960.

Missile Obligations: $7 Billion

Counting all development, construction procurement, and capital costs directly associated with missile programs, the Defense Department will obligate $6,986 million in fiscal 1961 for missiles. About 50 per cent of that money will go to our intercontinental ballistic missile programs. In fiscal 1960, total obligations for missiles are $6,634 million compared with $6,914 million in fiscal 1959, and $5,107 million in fiscal 1958. The leveling off in the program since 1959 is noteworthy. ICBM obligations are still rising as a percentage of the total program. Compared with the 50 per cent ratio of fiscal 1961, ICBM and IRBM projects take about 45 per cent in fiscal 1960; 43 per cent in fiscal 1959; and 40 per cent in fiscal 1958. (Obligations are plans to spend, not actual spending during the fiscal year.)

AEC: Too Slow on Power Reactors?

Public hearings on the development, growth, and state of the atomic energy industry begin Feb. 16. They'll be conducted by the Congressional Joint Atomic Energy Committee. John McCone, Atomic Energy Commission chairman, will be on the hot seat first to justify the AEC's civilian power reactor program, regarded by many Democrats as too slow in developing. He will also report on the Army, Navy, and Maritime Administration's reactor programs, the AEC's relations with industry, and the industrial use of isotopes.

Ground Support Equipment Directory

Metalworkers concerned with ground support equipment for missiles may obtain a copy of "Technical Resources Directory—Missile Ground Support Equipment" from the Office of Technical Services, Department of Commerce, Washington 25, D. C. Request Publication PB 161103. Components bought, the buying agency, and the contracting officer concerned are listed. Price is 50 cents.

Polaris, Minuteman Planning Revealed

Rear Adm. K. S. Masterson, director, Guided Missile Division, Office of the Chief of Naval Operations, says the Navy needs only 45 Polaris submarines. Funds for 15 have been requested through fiscal 1961. We have spent over $3.5 billion on the program so far.

Defense Secretary Gates reports Minuteman production will be at a rate of 30 birds a month. New production facilities are included in the new budget, as is the first money for construction of Minuteman bases.

Businessmen: Get into the Budget Fight

Commerce Secretary Frederick H. Mueller puts business on the spot if it wants tax relief. He says if a "great public response" protects the planned surplus of $200 million this fiscal year and $4.2 billion in fiscal 1961, then "at the appropriate time, we should consider substantial tax reform to give further encouragement to private business . . . I urge all businessmen to get into the budget fight."

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A heritage that safeguards every order for

ILLINOIS GEARS

To every order for ILLINOIS GEARS is added the traditional extra values that are made possible by the rich heritage of manufacturing experience, quality control and . . . very important . . . painstaking careful consideration in following every order through to the very last specification.

All of the hundreds of employees of ILLINOIS GEAR are dedicated to serve you. In all they aggregate a total of over 8000 years in the production of quality gears. Almost half of them have served between 10 and 25 years. Pride in a job well done is paramount with these craftsmen, many of whom are father and son teams.

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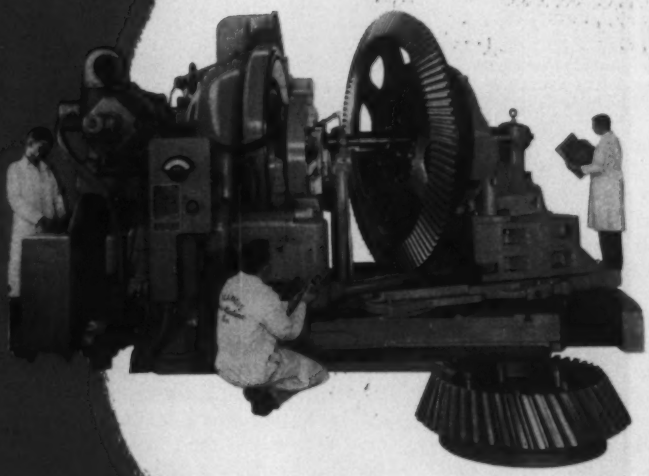

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. . . and Carlson special stainless steels withstand the extremes of another launching

When this missile "lifts off," Carlson special stainless steel plates help launch it into space. These plates are the high strength, precipitation-hardening grades. And there are sound reasons why these grades are used.

First, with Armco 17-4PH, 17-7PH and PH15-7 Mo* it is easier to attain the high physical properties and resistance to elevated temperatures required in space flight engineering. Simplified low temperature heat treatment will develop a Rockwell hardness of C40 to C50. Tensile strengths, so vital in missile components, range from 180,000 to 220,000 psi in plates.

Second, only Carlson produces these Armco grades in the heavier plate thicknesses. For applications where high strength at high temperatures and ease of fabrication are important, get plates in these grades from Carlson. We will be glad to work with you on specific applications.

*17-4PH, 17-7PH and PH15-7 Mo are trade marks of Armco Steel Corporation

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FLANGES • FORGINGS • BARS and SHEETS (No. 1 Finish)

Photo of Atlas missile courtesy
CONVAIR ASTRONAUTICS,
A Division of General Dynamics Corp.

Plan Trade Show Exhibits That Sell

About $4.5 billion will be spent by exhibitors this year. Smart planning and smart looking can be profitable to both the exhibitor and the potential buyer

THE CITY COUSINS of the old country fair, trade shows and industrial expositions, have burgeoned from a $500 million activity in 1940 to a multibillion dollar business. This year, industry will spend a record $4.5 billion to exhibit its wares.

That's a tremendous investment. The problem: How can you beef up your return?

Here are guideposts set up by professionals for both the exhibitor and the attender.

• **Planning** — That's the obvious first step, but many firms don't do an adequate job, claim the show managers. The first obstacle: The staggering number of shows, conferences, and meetings—local, regional, state, national, and international.

You'll want to determine four things when deciding which shows to enter, advises Gerritt Weston, advertising and sales promotion manager, industrial products, Footwear Div., U. S. Rubber Co., New York: 1. The interests of the people who attend. 2. Geographical factors—will the show be in a city that will attract good attendance? If it's a regional show, just what are the boundary lines of the area from which it will draw visitors? 3. Costs. 4. Seasonal factors.

No factor is more important than analyzing the audience of a show. For the big shows, you can get a lot of information from exhibition managers: The name, title, company affiliation, and breakdowns by SIC categories, of visitors at the previous show. You'll also want to find out which companies usually exhibit. But don't let a competitor's action influence your evaluation of a show.

• **Why Exhibit?** — Hand in hand with deciding what shows to enter, it's a good idea to sit down and do some hard thinking on why you should take part. International Nickel Co., for example, sees trade shows as a tool to: Promote the use of nickel, help its customers promote nickel, meet customers and prospects (including those it doesn't ordinarily get to see), and announce new products.

Remember, there's no other way you can see so many customers and potential buyers at so low a cost per contact.

• **Be an Early Bird** — Once you know what shows you'll be in, and why you'll be exhibiting, you're ready to start planning the specifics.

Don't be a "Late Louie," advise trade show people. Major shows are announced 8 to 14 months in advance. That's the time to start planning.

Early in the game, decide who is going to have the major responsibility for your exhibit. If you enter a number of shows, it's a good idea to have a manager of exhibits, suggests Kenneth E. Knowles, vice president, Clapp & Poliak Inc., New York. Or you might want to work it like Inco. It has a different co-ordinator for each show, who is a specialist on the subject of the exhibit.

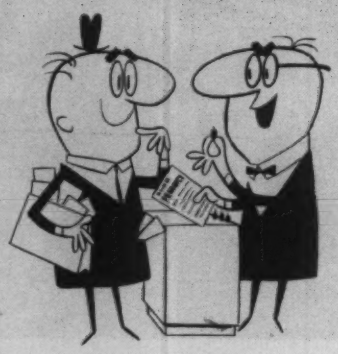
"In any event," advises Howard G. Sloane, managing director, New York Coliseum, "don't just toss off the job on one of your men as an additional duty. Give him adequate time, personnel, and funds to do the job right. And choose someone above the rank of office boy—someone with the authority to make decisions."

Don't keep your participation a secret. Take advantage of every publicity tool (see exhibit on Page 52). One way to get more mileage, Mr. Knowles suggests: Ask salesmen for the names of important contacts who are hard to see. Then write those people, enclosing a ticket to the show and encourage them to attend the show and visit your booth.

• **Through Visitors' Eyes** — What are you going to exhibit that will be of interest?

The person who looks at your

How to Get the Most from Your Trade Shows



If you're an exhibitor, boost results by . .

Avoiding gimmicks, giveaways, souvenirs.

Advertising and publicizing your exhibit via direct mail, personal invitations, ads and news releases in the trade press.

Staffing your booth with experienced people, both sales and technical. Have at least one executive on hand.

Assigning full responsibility for the exhibit—preparation and execution—to one individual.

Following the show management's instructions to the letter.

Concentrating on a central theme benefiting the visiting prospect.

Providing ample space and facilities for visitors to inspect products and talk with company representatives.

Your exhibit may flop if you . . .

Wait until the last minute to work out the details.

Use the show to break in new men.

Keep the same group of men manning the booth for 7 to 10 hours a day. Rule of thumb: Change booth teams every 4 hours.

Lose sight of the fact that metalworkers are there to look at products, not at lavish displays and gimmicks.

If you're attending, you'll gain more by . . .

Studying the exhibitor list and planning in advance which booths and products you want to see.

---

product is interested in one thing: "What can this do for me?"

So, says Clapp & Poliak, delegates want to see what's new. Don't forget that what is old stuff to some is new to others. Another point: A new use or application for an old product actually makes it new for many persons.

They are looking for ideas.

They hope to find solutions to production, cost, and quality control problems.

They are seeking sources of supply.

• **Customer Is Right** — Give the visitor what he wants. Clapp & Poliak suggests: Show product applications and problem solutions. Demonstrate your products. Identify all exhibit items thoroughly.

And don't fall so in love with the exhibit that you lose sight of its purpose. Says Mr. Knowles: "If just half the time spent on what color the booth should be, or what picture to hang where, were devoted to creating an explanation of the product, its characteristics and applications, exhibitors would be far better off."

Don't clutter up your exhibit, advises Manpower Inc., Milwaukee. Pinpoint its message and gear it to a single objective.

H. S. Lewis, assistant advertising manager for Inco, says it's all too easy to fall into the trap of making every show look like a "five and ten cent store." His company does not try to show every product. Exhibits are geared to a general approach, stressing the properties of nickel, examples of a few finished articles, and the theme that Inco is an authority on metals and can help customers with metallurgical problems. Since the average visitor spends about 3 minutes at each booth, you have to give him your message fast, says Mr. Lewis. That's why Inco is swinging to island exhibits with modular booths. They can be seen quicker, provide easier access for visitors, and make the showing of different products less confusing, he says.

• **Man Your Booths**—Whatever you do, have some of the best men in your organization manning your booths. Nothing can kill the exhibit quicker than inexperienced sales people, transient help, or a salesman not interested in anyone from outside his territory.

At many shows it's a good idea to use technical men who can talk with engineers and designers.

One idea: Why not prepare a manual for booth attendants? Include: A list of companies participating, what your own company is trying to accomplish through the exhibit, applications and properties of your product.

• **Gimmicks** — Avoid circus stunts that detract from the main purpose of your exhibit, advises E. K. Stevens, president, International Exposition Co., New York.

• **You and Your Pocketbook**—Exhibit space is the smallest item of expense you'll have to worry about. Manpower Inc. estimates space costs

Realizing the major shows can't be covered in one day. If you're going yourself or sending others, allow ample time to do the job right.

Sending only persons capable of evaluating the new products and processes that are on display.

Requiring persons you send to submit reports on the shows to interested departments and managers.

Don't be a . . .

Hurry-Up Harry: He allowed 3 hours to see 200 exhibits, talk with with 17 companies. Net result: He came home with a confused recollection of many things and the idea his time was wasted.

Hangover Hank: He forgot (or ignored) the main reason why he came to the show—lived it up until 3 a.m. and never refused a drink. Net result: He was too tired and out of sorts to do more than a fast turn around the exhibit hall.

Aimless Abel: He wandered back and forth, hither and yon, without any plan of whom or what he wanted to see. Net result: He completely missed several pieces of new equipment that might have solved a knotty production problem.

Opinionated Oswald: He came to the show with a closed mind about what he wanted to see and carefully averted his eyes when passing other exhibits. Net result: He missed an idea that would have saved his company money.

vary from $3.50 to $5 per square foot for the usual run of about three to five days.

Mr. Stevens says a small company may be able to purchase space for $350 and perhaps get by with total expenses of not more than $3000. An exhibit may cost $500 to $10,000, depending on what you want to do, he says.

Rule of thumb: The total cost of your exhibit should run about six times as much as the space charges. Expenses include shipping fees, erection and maintenance of exhibit, and the pro rata cost of building the exhibit.

Some of your biggest costs come in transporting your people to the exhibition and maintaining them while they are there. "This cost is often inflated," wryly comments one show manager, "by the tendency of some sales people to think of show week as a wonderful time to cleanse themselves of all those expenses that have been piling up. Personnel expenses during a show week should be no greater than they are at any other time of the year," he concludes.

You can minimize certain expenses by careful planning. Mr. Weston suggests using standard size panels (such as 4 by 8 ft) and prefabricating as much of the exhibit as possible to save on the high labor rates at exhibit halls. (Example: $7.50 to vacuum a rug.)

• **After the Show, What?**—If you want to get the maximum benefit from the show, have each man attending submit a report covering his observations, comments of others, what was accomplished. It's a nice gesture to send a card of appreciation to everyone who stopped by your booth. And if prospects have filled out cards requesting information or literature, follow up immediately.

• **Be a Pro Shopper**—If you're assigned to cover a trade show for your company, observe the dos and dont's displayed in the above checklist. Mr. Knowles suggest a company team might cover a show this way: First, obtain a list of the exhibiting companies. Then, call a meeting of production heads and make a list of the things they rate as the most important. Assign men to cover certain product categories. If it's the machine tool show, for example, have one or two men checking nothing but grinders, a similar team covering boring tools, another for lathes, and two or three "free lance" people to shop for ideas.

Give each team a floor plan with the exhibits they're to cover marked. Give the people enough time to do a thorough job. Have each team give a complete report and specific recommendations when they return.

• **Attendance Trends**—The number of shows and the number of people attending each one grow every year. The goal today: Refine attendance rather than increase it. The object: Attract more people exhibitors want, says Mr. Stevens.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

U. S. Asked to Transfer AEC Work to Private Industry

The U. S. Chamber of Commerce reports 36 examples of industrial and commercial work which private industry is ready and able to take over from the Atomic Energy Commission. They represent an important part of AEC work, the Chamber says.

The Chamber also cites a Sept. 21 directive from the Budget Bureau which states: "It is a general policy of the administration that the federal government will not start or carry on any commercial activity to provide a service or product for its own use if such product or service can be procured from private enterprise through ordinary business channels."

The examples are grouped in eight fields: Preparation of nuclear fuel, research and development, production of radioactive isotopes, irradiation service, reprocessing irradiated fuel, supplying depleted uranium, generating electricity, and supplying various materials, products, and services.

Demand for Engineers Zooms . . . While Supply Dwindles

- For every ten engineers they recruited last year, electrical machinery and electronic firms will need 16 in 1963.
- Aircraft firms will need 21 for every ten.
- Chemical firms will need 18 for every ten.
- The average industry will need 13 for every ten.

Engineering Graduates

1959	38,000
1960	38,500
1961	39,000
1962	36,500
1963	35,500
5-yr total	187,500
Annual avg	37,500

Source: Engineering Manpower Commission of Engineers Joint Council, New York.

Engineer Shortage Intensifies

FOR THE SECOND consecutive year, the number of freshman students enrolling in college engineering courses has declined. About 4 per cent fewer students signed up in 1959 than in 1958. And that follows an 11 per cent drop in '58 vs. '57.

It means that we'll have fewer new engineers to meet the sharp demand in the mid-'60s than we are getting now.

• **Reversal of Trend**—The decline represents a sharp reversal of the trend in the 1950-57 period, when each year's enrollment increased over that of the preceding year.

Many observers feel that industry has failed to do a good job of encouraging young men to enter the profession. The proportion of students enrolling in engineering compared with total college enrollment is dropping sharply—at a time when industry's projected needs are at a peak. Here's the trend reported by Engineering Manpower Commission:

Freshman Enrollment	Change—'59 vs. '57
Total	+13.4%
Male	+12.2%
Engineering	−14.3%

In 1957, engineering freshmen accounted for 17.8 per cent of all first year college males. In 1959, the figure dropped to 13.6 per cent, says EMC.

In the fall of 1959, engineering students accounted for about 8.7 per cent of all college undergraduate students—the lowest proportion since 1951, reports EMC.

During the last decade, the U. S. labor force has increased by roughly 21 per cent; the number of engineers jumped 65 per cent. Today's rapid technological pace demands that that trend continue—and perhaps accelerate. But, as EMC notes: "Unless some new factors come into play, such as increased utilization of women, we are limited in our capacity of providing engineering manpower." Here's how the number of engineers per million workers in the labor force has skyrocketed:

1900	1,415
1920	3,075
1940	5,400
1950	8,700
1960	12,000

• **U. S. Demand to Soar**—Between 12,000 and 15,000 new engineers will be needed annually in the U. S. just to replace those removed from the engineering work force. The remaining number will fall far short of industry's needs (see above table).

• **What to Do**—To protect yourself against the shortage, you must shoot for three objectives: 1. Use your present men more effectively. 2. Institute improved recruiting and training procedures. 3. Encourage high school students to select technical careers. EMC suggests working through parents, teachers, and guidance counselors, as well as with the students themselves.

EMC also advocates: 1. Insuring that creative men be given challenging work at the highest level of their capacities. 2. Placing greater emphasis on the role of the engineering technician. 3. A new "national manpower resources study" at the White House level. 4. Improvement in the quality of education at all levels. 5. Improved communications with the public on our technical education and manpower needs.

Julian W. Feiss, EMC chairman, invites "the support and co-operation of other organizations and individuals concerned with the vital problem of developing our engineering manpower resources."

SHEAR KNIFE

SIMONDS Has the Right One for Your Job

SLITTER KNIFE

If you use SHEAR KNIVES... single or four edge... there's a Simonds Shear Knife exactly right for your application.

And, if you use SLITTER KNIVES, there's a Simonds "Red Streak" Slitter Knife just right for the exact kind of metal you're slitting.

Both of these quality Simonds products are engineered to give you maximum performance. For example, Simonds Shear Knives are heat treated in atmospherically controlled furnaces to insure exactly the right temper and hardness for the desired application. And, each knife is precision ground and drilled to exact machine specifications.

ALL of Simonds Slitter Knives are forged for maximum strength and wear resistance. They are precision ground to close tolerances and feature a low micro-inch surface finish. Hardened and ground Spacing Collars are also furnished as "fitting" companions for the Knives.

Heat treated Separator Discs, made from Simonds Alloy-Steel, resist wear, stay flat, last for years.

Get full details on these top performers from your nearest Simonds Factory Branch—ask for Bulletins S-20 and S-65.

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Factory Branches in Boston, Chicago, Shreveport, La., San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que., Simonds Division: Simonds Steel Mill, Lockport, N. Y., Heller Tool Co., Newcomerstown, Ohio
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

WHY DOES IT PAY TO SPECIFY NICHOLSON OR BLACK DIAMOND FILES?

You get more for your money. You purchase efficiency. Nicholson and Black Diamond files are designed to produce maximum work. Careful attention is paid to size, shape, teeth, angle of cut. As a result, these files do more work in less time. That's where you save money in filing... time saved.

Nicholson and Black Diamond files are made from select steel. They are manufactured and inspected with infinite care. You save on tool replacement costs because this extra care and quality result in longer life.

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In addition you get careful attention when you purchase. Nicholson and Black Diamond files are sold exclusively through industrial distributors. They provide the finest goods in the least possible time. They know the products they sell, and can help you with your metal-removing problems.

The next time you order, specify Nicholson or Black Diamond brands. They represent quality of manufacture and performance.

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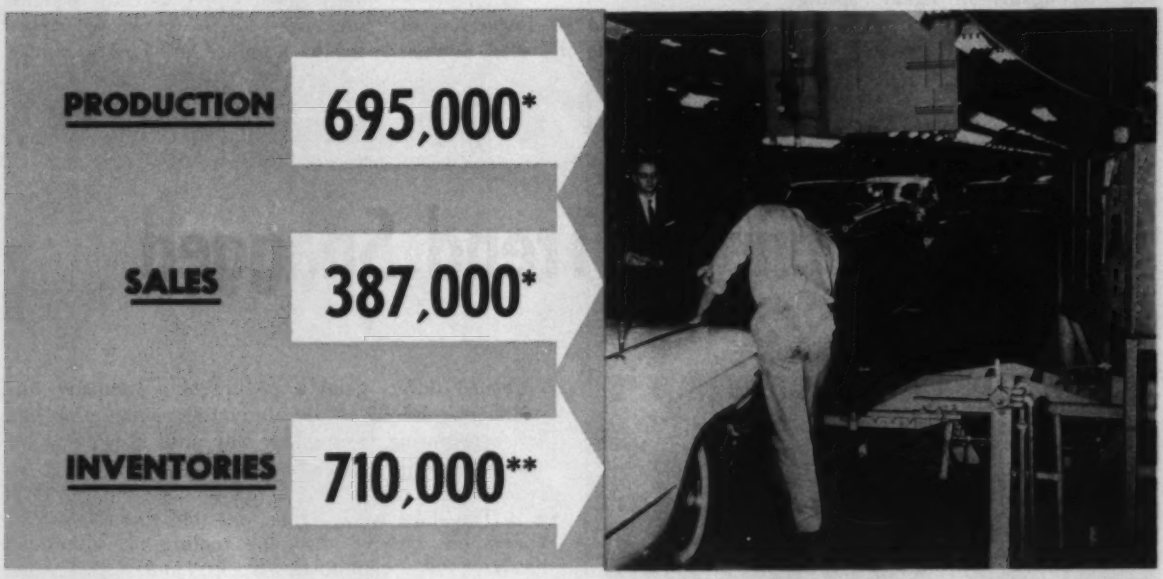
NICHOLSON FILE COMPANY, PROVIDENCE 1, R.I.
Files • Rotary Burs • Hacksaw and Band Saw Blades
Ground Flat Stock • Industrial Hammers



Estimated by STEEL: *January figures; **as of Feb. 1.

Autos: Still on Target, but—

IF SALES don't snowball in the next three weeks, look for a downward revision in Detroit's plans to build 2.25 million cars in the first quarter.

There are no signs so far that the industry will slash output, but rising inventories and lower than anticipated sales make it tough to justify building 750,000 cars monthly in February and March. Steel mills, however, say they have not yet received word to reschedule deliveries for the period.

January marks the first sales pickup since last October when 481,000 domestic automobiles were marketed. After the introductory month, sales slipped steadily to 380,000 units in November and 361,000 in December. Imports have added between 40,000 and 50,000 registrations to each month's total.

While sales dropped, production has climbed. Only 254,000 cars were built in steel short November, but output jumped to 595,000 in December. This month it will be close to 700,000, according to production rates shown in *Ward's Automotive Reports*. Result is that new car inventories have climbed from 550,000 at the start of the 1960 model year to more than 700,000 as February opens.

• **No Sweat**—The sales, production, inventory ratio still isn't alarming, but it is disappointing to autodom's enthusiasts who have been counting on compact cars to boost sales to better than 6.5 million this year, minus imports. The present rate is comparable to that in 1953 when Detroit sold 5.7 million cars.

But Detroit's hucksters have not given up hope. These winter months traditionally are lethargic saleswise. Several marketing men have told STEEL they feel it's taking longer than anticipated for consumer confidence to bounce back after the steel settlement. Tight credit and higher average monthly payments also are making buyers more cautious. Some prospects admittedly are

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,132
March	576,085	357,048
April	578,825	316,594
May	546,817	349,613
June	557,994	337,446
July	555,418	321,017
August	239,152	180,447
September	258,157	130,460
October	507,530	261,701
November	254,527	514,152
December	494,931	593,920
Totals	5,593,677	4,244,045

Week Ended	1959	1958
Dec. 26	103,219	104,907
	1960	**1959**
Jan. 2	112,113	97,664
Jan. 9	163,249	133,362
Jan. 16	173,713	135,953
Jan. 23	176,265†	126,843
Jan. 30	175,000*	119,678

Source: *Ward's Automotive Reports*. †Preliminary. *Estimated by STEEL.

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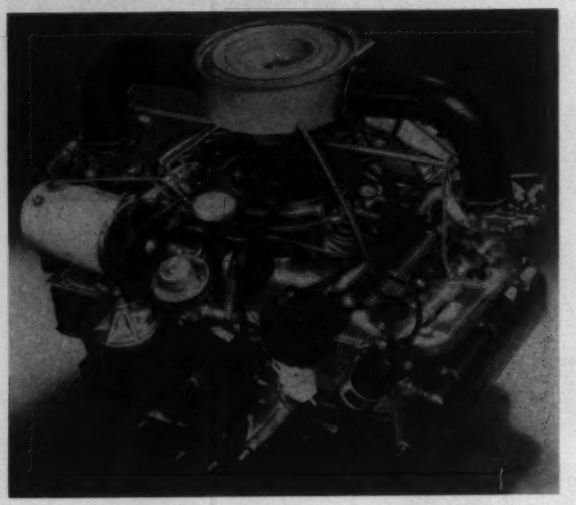
waiting for the compact station wagons.

Autodom is looking for signs that the "on again—off again" spring sales surge will be a landslide. In that case, all stockpiling of cars and high production quotas will have justified the thinking of motordom's marketing experts.

• **Compacts Hot** — Regardless of what happens to the total market, there's no question about the popularity of the compacts. Production of the five domestically built economy models has already equaled the entire 555,000 production record set by Rambler and Lark last year.

Aluminum Engine Trend Snagged



Chevrolet's Corvair aluminum engine

ALUMINUM ENGINES won't be coming as quickly as the light metal producers would have you believe. At the moment, American Motors Corp. is the only company that can possibly introduce an aluminum block engine in 1961 cars. Chevrolet will continue to offer its sandwich type aluminum engine in the Corvair.

General Motors Corp. is the latest auto company to raise the caution flag on its light metal powerplant. The 215 cu in., V-8 watercooled job had been scheduled for the Buick-Oldsmobile-Pontiac (BOP) compact cars, to appear in the fall, but recent information filtering down from factories and suppliers indicates GM is checking its bets on the deal.

Buick Div. will build the engines for the Buick and Oldsmobile compacts. Over a month ago, STEEL reported that the Buick machining line for the engine was being designed to handle either gray iron or aluminum. Other reports have it that development engineers are still searching for an antifreeze that won't leak through the aluminum blocks after they're sealed. Solutions that do work apparently set up galvanic action that corrodes radiator parts. Those apparently unrelated tidbits paint a picture of a company that still hasn't solved all its aluminum engine problems, so it's preparing to go either way until it can find the answers.

• **A Tip**—Last week, STEEL was told that Buick Div. finally has ordered dies and tooling for aluminum heads, intake manifolds, blocks, and transmission housings from a Detroit area firm. The head is designed for semipermanent molding. Other parts apparently will be cast in permanent molds. The contract reportedly includes responsibility for purchasing casting machines.

But here's the kicker. *The first set of 12 tools, dies, and machines isn't scheduled for delivery until Feb. 1, 1961!* A second set of tooling is due a year from that date. A third group for a larger aluminum engine to be used in regular size cars is to be delivered in February, 1963.

• **Results**—That means GM can't go with an aluminum powerplant in its compacts when they first appear. The 140 hp engine design will have to be cast in gray iron for Buick's and Oldsmobile's smaller cars. Pontiac may offer the gray iron job as an option, but the standard engine for the Pontiac version reportedly is a gray iron, in-line, four cylinder design, mounted at a 45 degree angle. STEEL's sources say it looks much like half of a regular V-8. Displacement supposedly is 197 cu in., giving it about 125 hp.

• **Roundup**—Other companies have run into problems with their aluminum engines too. Ford's permanent molded conversion of its 223 cu in. V-8 apparently has bogged down in a mire of machining and casting difficulties. It's not expected before 1962—possibly 1963.

Chrysler is converting its Slant Six 225 cu in. engine to permanent molded (later diecast) aluminum, but distortion of heads during machining plus some disagreement on the initial casting approach appear to have delayed its introduction for the 1961 model year.

American Motors Corp. has received at least one set of tooling for diecasting its regular in-line, six cylinder mill in aluminum. It's possible (but improbable) that AMC could put an aluminum powerplant into production during the 1961 model year.

NEW PRODUCTS

N/D's new integrally sealed, heavy-duty conveyor ball bearing shuts out moist and dry abrasive contaminants . . . reduces assembly time and eliminates costly re-lubrication maintenance.

N/D Introduces New Heavy-Duty Cost-Cutting Conveyor Ball Bearing!

Now you can cut conveyor operating and assembly costs substantially with the *new* heavy-duty N/D conveyor roll ball bearing.

This durable N/D precision ball bearing for conveyors incorporates an exclusive integral seal combination—a new, highly efficient Land-Riding Seal and a performance-proved Sentri-Seal. Its minimum torque seal combination shuts out both moist and dry abrasive contaminants . . . and seals in bearing lubricant for life.

This high performance bearing helps cut manufacturing assembly time . . . and helps reduce field assembly costs. These modern design N/D ball bearings require no outmoded separate seal closures, lubricant plumbing, adjusting nuts, springs or collars . . . they're virtually maintenance free!

N/D sealed ball bearings are interchangeable with other type bearings and mount directly on commercially available rolled shafting. Install a few in your conveyor section . . . then compare the reduced maintenance costs to other type bearings requiring constant relubrication. The results will be convincingly in favor of N/D integrally sealed ball bearings . . . year after year!

For additional information call your N/D Sales Engineer, or send today for the new N/D Heavy-Duty Conveyor Ball Bearing Bulletin. Write New Departure Div., General Motors Corp., Bristol, Conn.

Replacement ball bearings are available through United Motors System and its Authorized Bearing Distributors.

NEW DEPARTURE

BALL BEARINGS

proved reliability you can build around

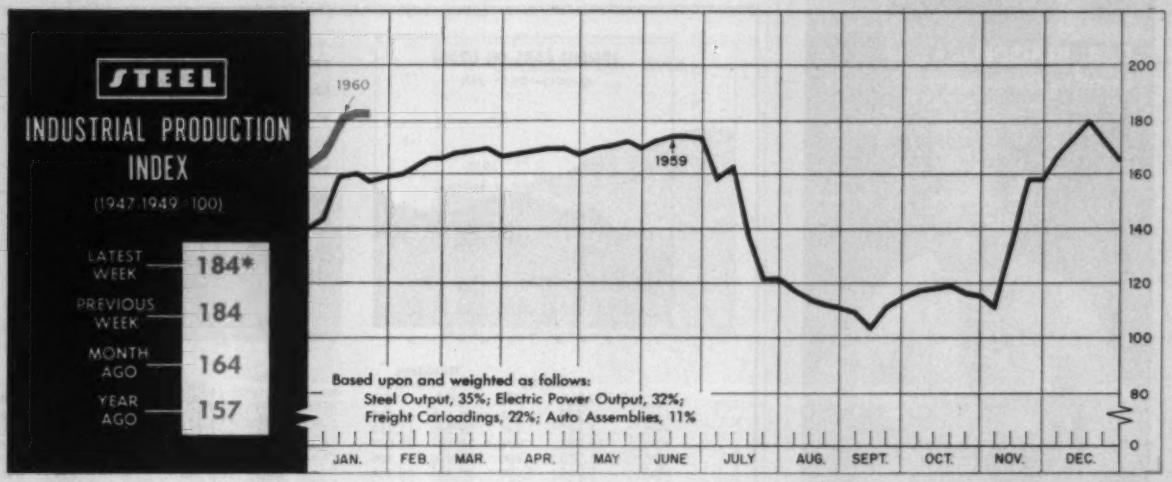
One steel can solve all these tricky parts problems—at a saving!

THESE parts do hard, tough jobs so they need a steel that's hard and tough. But their intricate shapes require a steel that's especially easy to machine.

Timken® 52100 steel has all these qualities. Here is a high-carbon alloy steel with high fatigue and tensile strength—plus good hardenability throughout its cross section. Timken 52100 steel machines easily, yet its fully spheroidized structure retains full strength and hardenability. It withstands working pressures up to 200,000 psi, oil quenches to a maximum hardness of 65/66 Rockwell C in normal sections.

Chances are you'll save money by reducing rejects when you specify 52100 steel made by the Timken Company. We pioneered 52100 tubing in America and the quality and uniformity of our product results from more than thirty years experience with this special steel.

Also, we're the *only* source for 52100 steel in all three forms, tubing, bars and wire. And for small runs or emergency needs, we maintain a mill stock of 52100 tubing in 101 sizes from 1″ to 10½″ O.D. We'll be glad to furnish a complete stock list of available sizes, grades and finishes. Just write The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". *Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.*



*Week ended Jan. 23.

Watch Backlogs for Trend Clues

KEEP YOUR EYES on backlogs. They are rising now, but they may give you a clue about the turn of the business cycle widely predicted for later this year or early next.

Starting from a recession low point of $46.1 billion in October, 1958, total manufacturers' unfilled orders climbed to a little over $51.5 billion by Dec. 1, the latest reporting date. From all appearances, the climb is continuing. However, this is still considerably below the peak level of $64.2 billion in December, 1956, and it is doubtful that the record will be challenged for many months to come. There are two big reasons: 1. Capacity is more than sufficient to handle normal demand for goods. 2. Modernization and increased efficiency have cut leadtime on many items which have accounted for huge backlogs in the past.

• **Lessons from the Past**—In at least two of the last three recessions, heavy backlogs have clouded the forecasters' vision. Prior to the 1957-58 dip, manufacturers began cutting into unfilled orders eight months prior to the big drop in production which began in September. Even then few persons realized the economy was in a full fledged recession because backlogs were cushioning the blow until well into the final quarter of the year.

Prior to the 1953-54 recession, unfilled orders began to drop seriously in February, five months before the Federal Reserve Board's industrial production index began its plunge. (The peak in backlogs was first reached in September, 1952, followed by a slight dip and another rise until February.)

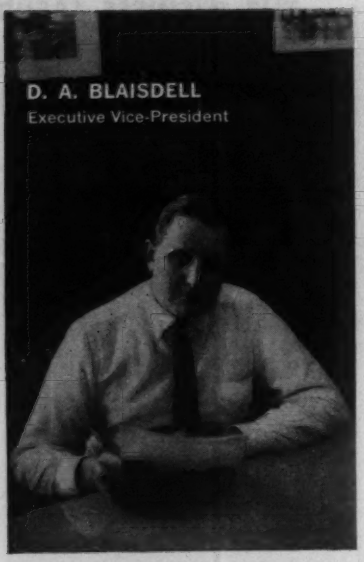
No comparable decline developed prior to the 1948-49 recession. Unfilled orders peaked rapidly after the close of World War II, then tapered off from late 1946 until the Korean War buildup in 1950.

• **Applying the Lessons**—If backlogs top out during the first half,

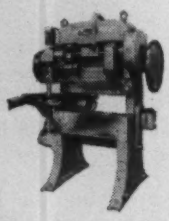
BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,721[1]	2,727	2,178
Electric Power Distributed (million kw-hr)	14,200[1]	14,236	13,394
Bituminous Coal Output (1000 tons)	8,830[1]	9,000	8,290
Crude Oil Production (daily avg—1000 bbl)	7,125[1]	7,146	7,194
Construction Volume (*ENR*—millions)	$372.9	$415.6	$388.1
Auto, Truck Output, U. S., Canada (*Ward's*)	218,145[1]	214,068	159,893
TRADE			
Freight Carloadings (1000 Cars)	600[1]	606	554
Intercity Truck Tonnage (changes from year ago)	+6.9%	...%	...%
Business Failures (Dun & Bradstreet)	292	242	294
Currency in Circulation (millions)[3]	$31,910	$32,282	$31,385
Dept. Store Sales (changes from year ago)[3]	+3%	+9%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$27,631	$25,522	$26,294
Federal Gross Debt (billions)	$291.8	$292.4	$282.8
Bond Volume, NYSE (millions)	$27.3	$27.7	$34.7
Stocks Sales, NYSE (thousands of shares)	14,219	17,681	19,298
Loans and Investments (billions)[4]	$104.0	$103.9	$102.3
U. S. Govt. Obligations Held (billions)[4]	$27.4	$27.0	$33.8
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	234.2	233.7	214.9
All Commodities[7]	119.3	119.2	119.6
Commodities Other than Farm & Foods[7]	128.7	128.7	127.4

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

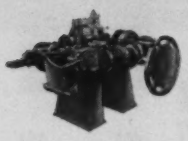


the special meaning of **BAIRD**



A hundred and fourteen years is a long time, but that's exactly how long Baird has been in the business of building high production machinery for turning out pistons and paper clips... light bulb sockets and safety pins. We've built chuckers for the automotive and appliance folks, four-slide units and transfer presses for the wire and ribbon forming people, bench presses, vertical lathes, and tumbling barrels for thousands of big and little companies.

Since 1846 Baird machines have been designed right and built right... to perform as specified and earn their cost, many times over. Our customers have come to know this.



They have come to know, too, that the name "Baird" on their machine has a special meaning. From our sales representative's first call, right through sample work, quoting, tooling, delivery, installation and service... they can always count on Baird coming through. Making fine machinery is only part of the special meaning of Baird. We make good friends, too.

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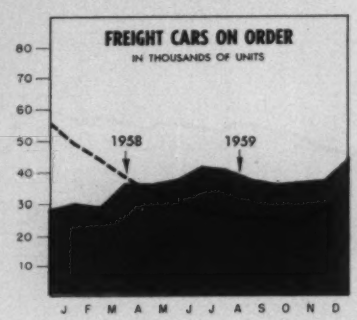
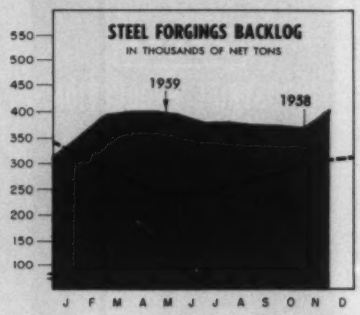
THE BUSINESS TREND





	Awards		Backlogs (end of month)	
	1959	1958	1959	1958
Jan.	4,102	401	29,470	48,787
Feb.	1,842	287	28,789	43,750
Mar.	10,782	204	35,487	38,027
Apr.	3,735	400	35,479	32,908
May	5,203	1,391	36,869	30,386
June	8,369	320	40,973	27,757
July	4,159	386	40,309	25,994
Aug.	1,653	1,773	37,172	25,611
Sept.	943	1,585	35,626	24,982
Oct.	2,722	666	36,199	23,670
Nov.	2,424	6,295	36,555	27,962
Dec.	10,560	3,706	43,870	27,596
Totals	56,494	17,414		

American Railway Car Institute.
Charts copyright, 1960, STEEL.

	Shipments		Unfilled Orders	
	1959	1958	1959	1958
Jan.	113	108	353	318
Feb.	113	93	392	289
Mar.	129	92	396	266
Apr.	136	83	398	242
May	142	78	394	240
June	140	88	375	246
July	103	67	377	256
Aug.	98	80	376	279
Sept.	103	89	374	287
Oct.	97	100	373	303
Nov.	87	89	403	307
Dec.	...	...	113	313

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.

it might be a good idea to re-evaluate your position. But don't push the panic button at the first sign of a decline. Remember, the first sign of attrition in backlogs in 1952 was followed by several months of heavy demand. This, as most business indicators, should be viewed in conjunction with several others in making business plans.

• **Pressure Still Firm**—At the moment, there is still plenty of steam behind backlogs. The graphs above illustrate just two cases. Heavy orders for railroad freight cars pushed backlogs up for the third consecutive month, reaching the highest point since January, 1958. This trend line is likely to continue rising for several months as the roads rush building plans delayed by the steel strike. Unfilled orders in the steel forgings industry are at a 27 month high.

Even though the ferrous foundry picture is distorted somewhat because of the effects of the steel strike, it appears that casting backlogs are holding to the relatively high levels built up in the first part of 1959. During the latest period of record, all three categories—gray iron, malleable, and steel—showed modest gains.

Manufacturers of resistance welders report that value of orders on hand crossed the $10 million mark Dec. 1 for the first time since July, 1957. That is better than double the figure at the depth of the recession in October, 1958, reports the Resistance Welder Manufacturers Association.

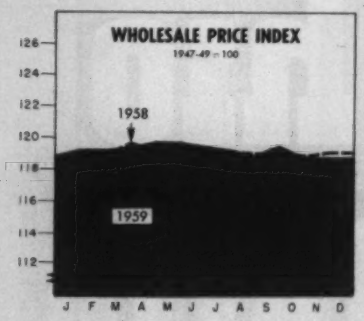
• **Individuals Bullish**—Some of the reports from individual companies are even more impressive. Cutler-Hammer Inc. reports a softening in new orders, but its backlog is holding about 15 per cent above the year-ago figure.

Allis-Chalmers Mfg. Co. notes that at latest count its unfilled orders total $241.7 million, about 25 per cent above the corresponding figure a year earlier.

Bucyrus-Erie Co.'s yearend backlog stood at about $6 million against $2 million a year earlier.

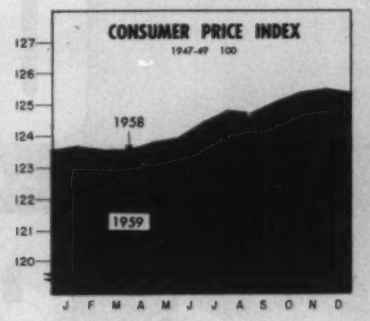
Joy Mfg. Co., which cut its unfilled orders to $6 million or $7 million during the steel strike, says they are already back up to $11 million, indicating continued strength in the mining machine industry.

Cincinnati Milling Machine Co. began 1960 with a backlog worth $47 million, considerably above the



	All Commodities 1959	All Commodities 1958	Other Than Farm & Foods 1959	Other Than Farm & Foods 1958
Jan.	119.5	118.9	127.5	126.2
Feb.	119.5	119.0	127.8	125.7
Mar.	119.6	119.7	128.1	125.7
Apr.	120.0	119.3	128.3	125.5
May	119.9	119.5	128.4	125.3
June	119.7	119.2	128.2	125.3
July	119.5	119.2	128.4	125.6
Aug.	119.1	119.1	128.4	126.1
Sept.	119.7	119.1	128.5	126.2
Oct.	119.1	119.0	128.4	126.4
Nov.	118.9	119.2	128.5	126.8
Dec.	118.9	119.2	128.6	127.2

U. S. Bureau of Labor Statistics.



	1959	1958	1957
Jan.	123.8	122.3	118.2
Feb.	123.7	122.6	118.7
Mar.	123.7	123.3	118.9
Apr.	123.9	123.5	119.3
May	124.0	123.6	119.6
June	124.5	123.7	120.2
July	124.9	123.9	120.8
Aug.	124.8	123.7	121.0
Sept.	125.2	123.7	121.1
Oct.	125.5	123.7	121.1
Nov.	125.6	123.9	121.6
Dec.	125.5	123.7	121.6

U. S. Bureau of Labor Statistics.

$30 million figure of a year ago.

Revises Leading Indicators

Prentice-Hall Inc., Englewood Cliffs, N. J., has come up with a revised list of leading short term indicators which you can use along with backlogs, inventories, and any others you may depend on. Basically, it is a revision of the well known leading indicators developed by the National Bureau of Economic Research. Business failures and new incorporations have been dropped because they were not considered sufficiently sensitive. New orders for machine tools and gears have taken their place.

New hiring and layoff rates in manufacturing have been added, making a total of ten trend leading indicators. The others are: New orders for durable goods; floor area of residential building awards; heavy construction awards; average workweek; industrial raw material prices; and industrial stock prices.

For the latest month (mostly December, with a scattering of November reports), six are in a downtrend and four point up. However, the effects of the steel strike were still present in a few cases, so it will be another month or two before it can be determined if the trend is accurate. Of the 20 trend-coincident indicators, P-H says 12 are up and only eight are down.

Index Levels at Record

High level output of both steel and autos once again held STEEL's industrial production index at a record mark. For the second consecutive week, the trend line stood at 184 (1947-49 = 100) for the period ended Jan. 23.

With the exception of the Christmas week, steel production has varied only 17,000 tons since the all-time record was set in early December. It has held at about 95.5 per cent of capacity for four consecutive weeks, and it is not likely that it will fluctuate much.

Production of autos and trucks is about as high as it is likely to go during the next few weeks. With about three-fourths of the assembly plants working six days a week, there is not too much room for expansion. In addition, sales, though improving, are still not high enough to justify heavier schedules. *Ward's Automotive Reports* says the feeling is growing that Detroit has overscheduled for the first quarter.

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U. S. Steel operations post

BURLEIGH E. JACOBS JR.
Grede Foundries president

GEORGE S. MIKHALAPOV
Brush Beryllium pres.

STANLEY J. PATERAK
Worcester Gear Wks. prod.

Thomas W. Hunter was made general manager, operations-steel at **United States Steel Corp.**, Pittsburgh. Former general superintendent, Gary Steel Works, Gary, Ind., he is succeeded by **Frederick A. Dudderar. John M. Walsh Jr.** succeeds Mr. Dudderar as general superintendent, Clairton Works, Clairton, Pa. Named assistant general superintendents at Gary are: **Raymond W. Sundquist** in charge of coke, iron, and steel production; **John V. Dorman**, rolling and finishing; **Everett C. Sorrells**, services.

Louis J. Hemmelgarn was elected vice president-general manager, **South Bend Tool & Die Co. Inc.**, South Bend, Ind.

Putnam B. McDowell was elected vice president-administration, a new post, at **Pittsburgh Coke & Chemical Co.**, Pittsburgh.

Dr. Russell D. O'Neal was elected vice president-engineering, **Bendix Aviation Corp.**, Detroit. Former general manager, Bendix Systems Div., Ann Arbor, Mich., he is succeeded by **Roy J. Sandstrom. L. B. Young** succeeds Mr. Sandstrom as assistant general manager of the division.

R. Edgar Retzler was made assistant to the president, **Johnston & Funk Metallurgical Corp.**, Huntsville, Ala. He will manage the Midwest sales office in Wooster, Ohio.

Earl A. Erich was elected vice president, **Tube Turns Plastics Inc.**, Louisville. He was sales manager.

Burleigh E. Jacobs Jr. was elected president, **Grede Foundries Inc.**, Milwaukee, succeeding **Wm. J. Grede** who fills the new post of chairman. Mr. Jacobs was a vice president. **Arthur L. Grede** was elected vice chairman, continuing as first vice president.

George S. Mikhalapov was elected president, **Brush Beryllium Co.**, Cleveland. **Bengt Kjellgren**, former president, was elected chairman and continues as chief executive officer. Mr. Mikhalapov was executive vice president. **C. Baldwin Sawyer**, former chairman, becomes chairman of the executive committee.

S. Eugene Weed was made director-research and development at **Vesuvius Crucible Co.**, Swissvale, Pa., succeeding **C. A. Styer**, retired.

Glen H. Treslar fills the new post of general sales manager, Industrial-Automotive Div., **Black & Decker Mfg. Co.**, Towson, Md.

Clyde W. Jernigan joined **M. M. Hedges Mfg. Co. Inc.**, Chattanooga, Tenn., as co-ordinator of its expansion program.

Charles E. Swab, vice president, succeeds **William H. Ramage** who retires as chairman of **Valley Mould & Iron Corp.**, Hubbard, Ohio.

Milton M. Garvin was named vice president-manufacturing and engineering, **Bardes Corp.**, Cincinnati. He was in charge of manufacturing for American Radiator & Standard Sanitary Corp. at Cincinnati.

Stanley J. Paterak was made superintendent of all production at **Worcester Gear Works Inc.**, Worcester, Mass. **James W. Barker** was made assistant superintendent.

Louis W. Mason was made general sales manager, **National Tube Div.**, U. S. Steel Corp., Pittsburgh. He succeeds **Robert E. Williams**, recently made vice president-sales.

Harry G. Schwab, plant superintendent, was made director of manufacturing for both the Toledo, Ohio, and Kalamazoo, Mich., operations of **Bunting Brass & Bronze Co.**

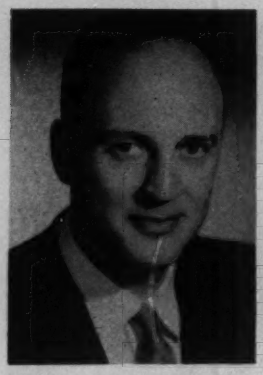
Bruce O. Young was made product manager-alloy and carbon specialties at **Crucible Steel Co. of America**, Pittsburgh.

Henry B. Crutcher was made manager of **Progressive Welder Sales Co.'s** newly expanded Automotive Engineering Div., Detroit.

Robert E. Greiss was named production manager for manufacturing and assembly departments of **Selas Corp. of America**, Dresher, Pa. **A. W. Kiesel** was made superintendent-manufacturing.

Carl Pearson was made engineer in charge of the newly formed Machinery & Equipment Dept., **Fisher Body Div.**, General Motors Corp., Detroit.

William H. Gordon was made manager of plant engineering, **Aerojet-General Corp.**, Downey, Calif., sub-



WILLIAM J. EDMUNDS JR.

ROBERT F. TIGHE

Kaiser Aluminum & Chem. div. managers

DR. E. G. FUBINI

DR. G. C. COMSTOCK

Airborne Instruments Lab officers

sidiary of General Tire & Rubber Co.

In the Industrial Div., **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif., **William J. Edmunds Jr.** was made manager-sheet and plate; **Robert F. Tighe** manager-extrusions and forgings, succeeding Mr. Edmunds. Mr. Tighe was Great Lakes regional sales manager for the corporation.

Richard R. Rue was made plant manager of **Insul-Mastic Inc.**, Summit, Ill., subsidiary of Pittsburgh Coke & Chemical Co. He was research director.

James E. Longenecker was made chief mechanical engineer, **Magnetic Metals Co.**, Camden, N. J. He replaces **Cortis F. Sherman**, retired.

Jefferson J. Davis, former vice president-Product Divisions, **Electric Steel Foundry Co.**, Portland, Oreg., was named executive vice president, a new post.

Airborne Instruments Laboratory, Deer Park, N. Y., appointed **Dr. E. G. Fubini** vice president-research and systems engineering; **Dr. G. C. Comstock** vice president-electronic systems and techniques. Both are newly created divisions.

Edward H. Ball Jr. succeeds his father, **E. H. Ball**, who resigns as president, **Chicago-Allis Mfg. Corp.**, Chicago, subsidiary of Chicago Belting Co.

Robert D. Weiser, sales manager, **Minnesota Bearing Co.**, Minneapolis, was elected president to succeed his father, **J. K. Weiser.**

Larry Dwyer was made vice president-sales, **Clad-Rex Div.**, Chicago, Simoniz Co. He was division sales manager.

W. P. Woods was made chief tool engineer for **Convair Div.**, San Diego, Calif., General Dynamics Corp. He is in charge of tool engineering and tool manufacturing at Plants 1 and 2. Mr. Woods succeeds **A. E. Hill**, who joined the staff of **A. C. Esenwein**, Convair executive vice president.

Harold Hertzog was elected president, **Alpha Metals Inc.**, Jersey City, N. J. **Martin A. Boyle** was made vice president-sales.

Joseph W. Wells was made chief product engineer; **Roland E. Brault** chief industrial engineer, **Wallace Barnes Div.**, Bristol, Conn., Associated Spring Corp.

Milton E. Kluge was made chief industrial engineer, **Gould-National Batteries Inc.**, St. Paul, and for its subsidiaries. He was in charge of industrial engineering for the Industrial Battery Div.

Carl G. Hogberg was appointed president, **Michigan Limestone Div.**, Detroit, U. S. Steel Corp. He succeeds **Christian F. Beukema**, recently named president, Oliver Iron Mining Div.

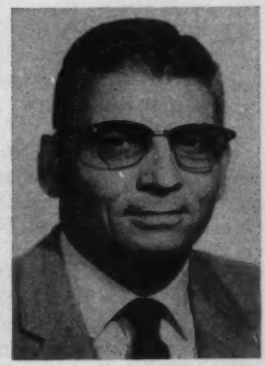
J. A. Bruce Pinney was made assist-

JEFFERSON J. DAVIS

Electric Steel Foundry exec.

LARRY DWYER

Clad-Rex sales v. p.



W. P. WOODS

Convair chf. tool eng.

CARL G. HOGBERG

Michigan Limestone president

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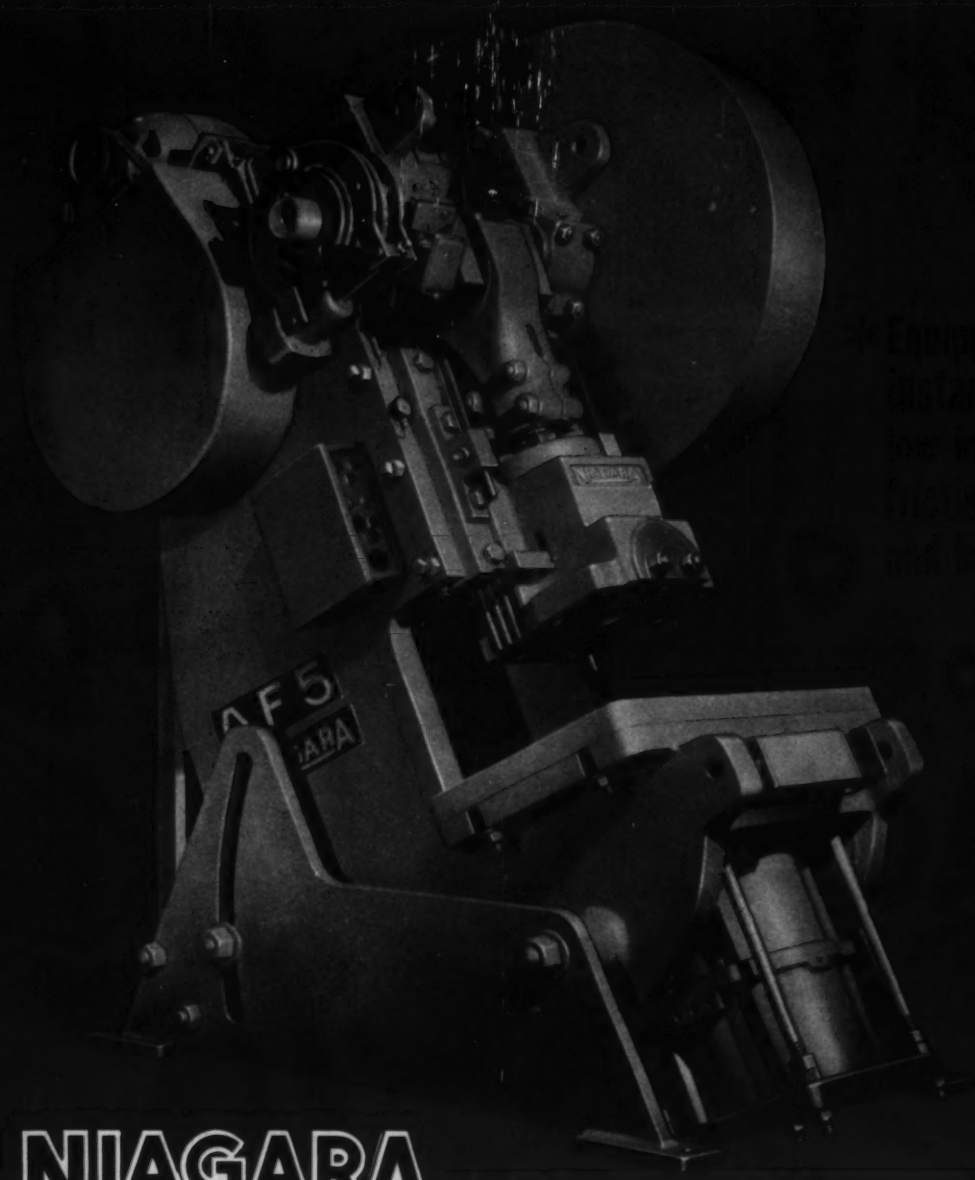

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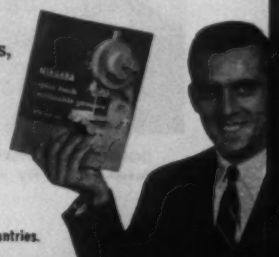

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Wagner Electric marketing

T. KENNETH McGUIRE
DeVilbiss v. p.

DANIEL J. SULLIVAN
Republic Steel supt.-Chicago

J. R. JOHNSON
Royal Industries pres.

ant chief engineer, **Alan Wood Steel Co.**, Conshohocken, Pa.

Harold N. Felton was promoted from vice president-sales to vice president - marketing at **Wagner Electric Corp.**, St. Louis. **Carl E. Widell** was made assistant vice president-marketing; **Ralph W. Boeringer**, vice president-industrial relations. **Harold S. Garrett**, assistant director-purchases, was made director of purchases.

Robert G. Rowe joined **Exolon Co.**, Tonawanda, N. Y., as manager-product development. He was with Carborundum Co.

J. Howard Dunn was named manager, Process Development Laboratories, New Kensington, Pa., for **Aluminum Co. of America.** He was manager, Cleveland Sales Development Div.

Donald H. Ambrose, foundry superintendent, **Rosedale Foundry & Machine Co.**, Pittsburgh, was elected a vice president.

T. Kenneth McGuire was named a vice president of **DeVilbiss Co.**, Toledo, Ohio. He was vice president-general manager of the subsidiary, DeVilbiss Metal Fabricators Co., Detroit, and continues to direct its activities.

Daniel J. Sullivan was made superintendent, blooming and billet mills, at the Chicago district steel plant of **Republic Steel Corp.** He succeeds **R. F. Lavette**, retired. Mr. Sullivan was assistant superintendent of the mills.

Herbert F. Barrett was promoted to general sales manager, **Buffalo Meter Co. Inc.**, Buffalo. He was sales manager. **Richard H. Hawk** was made assistant sales manager for industrial meter sales of Niagara Liquid Meters. **Howard L. Edwards** was named sales manager, water meter sales for American Meters.

Standard Steel Corp. named Vice President **James E. Cox** general manager of its Cambridge Div. in Lowell, Mass.

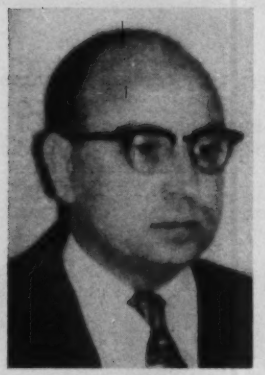
J. R. Johnson was elected president, **Royal Industries Inc.**, Los Angeles. Former executive vice president, he succeeds **M. L. Bengtson**, resigned for reasons of health.

William C. Hitt was named executive director of ultrasonics for **Automation Industries Inc.**, Manhattan Beach, Calif. He was president of Ultrasonic Testing & Research Laboratory, Van Nuys, Calif., prior to its acquisition by Automation.

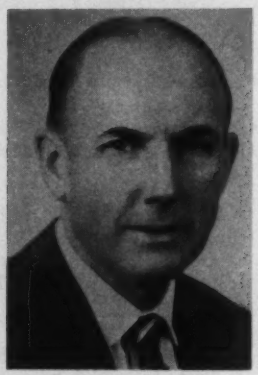
John V. Houston Jr. was made assistant manager-West Coast sales and development for **Climax Molybdenum Co.**, a division of American Metal Climax Inc. He is in Los Angeles.

Charles A. Hathaway was appointed assistant general manager, Air Impeller Div., **Torrington Mfg. Co.**, Torrington, Conn. He is responsible for all division engineering, sales, and production operations. He was director of engineering.

James M. Northrup was appointed



DONALD H. AMBROSE
Rosedale Foundry v. p.



HERBERT F. BARRETT
Buffalo Meter gen. sales mgr.

JAMES E. COX
Standard Steel div. post

CHARLES A. HATHAWAY
Torrington-Air Impeller post

HOWARD M. WINTERSON
new post at Blaw-Knox

M. C. SMALLEY
Nichols Wire prod. dev. eng.

J. T. DOYLE
Polyken gen. sales mgr.

AL N. QUINN
Automatic-Dynamotive sales

JOHN J. OWEN
Millers Falls exec. v. p.

WILLIAM H. LEHR
Dravo equipment sales mgr.

vice president-sales, **United Platers Inc.**, Hamtramck, Mich.

Al N. Quinn was made sales manager - Dynamotive for **Automatic Transportation Co.**, Chicago. He was an owner of a dealership in the material handling field before joining Automatic.

John J. Owen was elected executive vice president, **Millers Falls Co.**, Greenfield, Mass. He is in charge of production, engineering, and sales. He was a vice president.

John L. Marshall, assistant general sales manager, **Cyclone Fence Dept.**, Waukegan, Ill., American Steel & Wire Div., U. S. Steel Corp., transfers to Cleveland headquarters of the division to serve as assistant manager of Cyclone Fence sales.

James E. Duffy, assistant chief engineer at South Works and later at Gary, Ind., Works of **United States Steel Corp.**, returns to South Works, Chicago, as chief engineer. He succeeds the late **Kenneth E. Dinius.**

William H. Lehr was made manager-equipment sales, Engineering Works Div., **Dravo Corp.**, Pittsburgh. He formerly served on the sales staff of the Material Handling Dept.

Edward J. Rexer was elected president of **Prudential Industries**, Philadelphia, to succeed **Oliver J. R. Troup** (founder) who fills the new post of chairman. Mr. Rexer was executive vice president. He also was acting sales manager of the subsidiary, Atlas Chain & Mfg. Co.

J. Richard Sayers was made assistant director, Purchasing & Traffic Dept., **Monsanto Chemical Co.**, St. Louis. Effective Feb. 4, he succeeds **Prescott Sandige**, retiring, due to ill health.

Detroit Controls Div., American Radiator & Standard Sanitary Corp., named **John R. Warnock** general manager - marketing, **Richard L. Campbell** director of engineering, **George F. Butterfield** general manager of manufacturing.

Howard M. Winterson was promoted to the new post of vice president-general services, **Blaw-Knox Co.**, Pittsburgh. Former vice president-industrial relations, he has general supervision over Purchasing and Traffic Depts. He continues to direct the Industrial Relations Dept.

M. C. Smalley fills the new post of products manager, **Nichols Wire & Aluminum Co.**, Davenport, Iowa. He was sales representative. He will direct research, design, and development of new aluminum products.

J. T. Doyle was made general sales manager, **Polyken Sales Div.**, Kendall Co., Chicago. He was general manager of Kendall's Andrews-Alderfer Div. **W. J. Hodges** was made Polyken sales manager.

Consolidated Vacuum Corp., subsidiary of Consolidated Electrodynamics Corp., established regional sales and service offices in Philadelphia and Palo Alto, Calif. **William C. Cameron** was named manager, eastern regional office; **Robert O. Johnson** manager, western regional office.

Earl W. Mahaney, former chief metallurgist, heads the new department of quality control at **Youngstown Sheet & Tube Co.**, Chicago.

OBITUARIES...

Lazarus Chapman, 65, chairman, **H. Kramer & Co.**, Chicago, died Jan. 15.

Duane E. Steinle, 46, sales manager, Lucas Div., **New Britain Machine Corp.**, Hartford, Conn., died Jan. 18 in a Capital Airlines plane crash in Virginia.

G. Guy Owens, 67, procurement manager for the Construction Dept. of **Merritt-Chapman & Scott Corp.**, New York, died Jan. 19.

Samuel Luntz, 97, a pioneer in the iron and metal trade, died Jan. 21 in Canton, Ohio. He was founder of **Canton Iron & Metal Co.** and helped establish Empire Steel Co., Mansfield, Ohio.

For new design flexibility . . . beauty . . . long life!

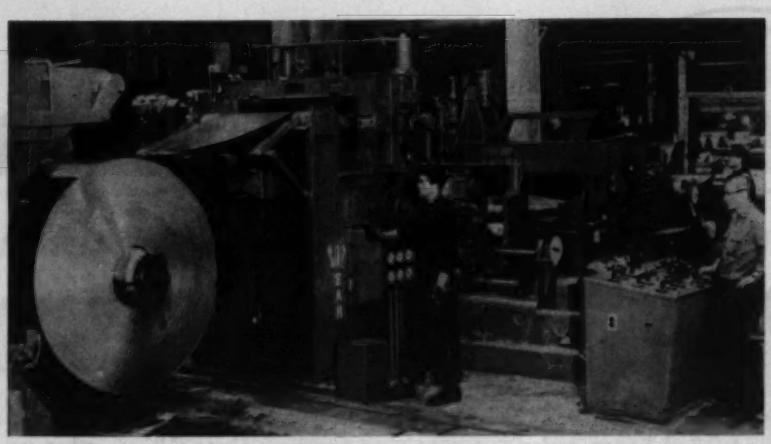
SPECIFY SHARON STAINLESS

Sharon Stainless Steels have proved through use to be of consistent high quality, uniform, bright and smooth with a dense finish. For both interior and exterior fittings you will find Sharon can supply your need exactly with the tolerance, drawing ability and finish your product requires for greatest appeal and durability.

Consider too, Sharonart*, Sharon Steel's exciting new rolled-in surface patterned steel—opening a new breadth of design flexibility for the automotive designer. Sharonart*, made of stainless steel will reflect an infinite variety of color and texture combinations. Many beautiful patterns available.

For the stainless you need to make your product better—get in touch with your Sharon representative—or write us direct. **Sharon Steel Corporation, Sharon, Pa.**

SHARON *Quality* **STEEL** SHARONSTEEL



A side trimming line installed at Weirton Steel Co., a division of National Steel Corp., facilitates production of tin plate in coils. It operates at a speed of 4000 fpm and can handle 30 ton coils, 85 in. OD and 45 in. wide

Steel Industry Earmarks $1.6 Billion for Expansion

CAPITAL EXPENDITURES of $1.6 billion have been budgeted by iron and steel companies this year. This is $640 million above the 1959 total (restricted by the labor dispute) and is only $150 million below the industry's record outlays in 1957, says the American Iron & Steel Institute.

The amount of new construction and equipment that the 1960 budget will provide will be substantially less than in 1957 because "inflation has boosted the cost," the institute noted. Here is some recent activity:

• **Weirton Steel** — A side trimming line was added to the Tin Mill Dept. to facilitate the production of tin plate in coils. Function of the line is to trim the sides of the sheet steel before it is plated so it can be wound into coils and be ready for shipment as it comes off the tinning line.

The firm's No. 4 and No. 5 tin plating lines have been equipped with edge control reels which insure that each coil is wrapped with a straight edge. This is necessary to prevent damage to the edges in bundling and shipping and also because straight edges are required when coils are processed further by customers.

W. H. Wright, vice president and chief engineer, also announces installation of a new bundling line. It utilizes machinery to wrap coils in heavy paper and fasten them with steel straps.

• **U. S. Steel**—New facilities slated for the Youngstown District Works will widen the plant's product range and will increase production of high quality, open hearth, alloy steel. Production of open hearth, alloy steels for strip and "T-1" grade sheets and bars will be increased by 11,000 tons. Production of other high quality steels, such as Cor-Ten and Tri-Ten, also will be increased.

Three warming furnaces will be constructed at the Ohio Works's primary mills. They will consist of one 150 ton bottom furnace at the 40 in. mill and two 70 ton, car type furnaces at the 43 in. mill. The furnaces will make it possible to better control temperature before and after the rolling operation.

Additional quality control facilities will be placed in the Open Hearth Dept., permitting metallurgists to make speedy tests by the use of spectograph during the steelmaking process. Other major improvements include a new soaking pit at the 40 in. mill and new slow cooling facilities at No. 14 mill at McDonald Works.

Increased quality is the objective of a move at the corporation's Gary (Ind.) Sheet & Tin Mills plant. The project adds a two stand, tin temper mill to the facilities. Top rolling speed of the mill is 6000 fpm. Electrical equipment was furnished by Allis-Chalmers Mfg. Co., Milwaukee.

• **Republic Steel**—Construction of a new coke conveyor at the Cleveland plant will be completed by late spring. It will replace current haulage methods: Coke is transported by hopper car from the coke plant on the east side of the Cuyahoga River to four blast furnaces on the west side.

When in operation, the conveyor's 48 in. Goodyear belt will have a capacity of 300 tons of coke an hour, traveling at 240 fpm. It has three flights totaling 2593 ft. The conveyor is carried in a completely enclosed gallery 12 ft wide at the bottom and varying in height from 10 to 16 ft. The conveyor was designed and constructed by McDowell Co. Inc., Cleveland.

Coke is fed onto the first belt from a boom conveyor, newly installed by Koppers Co., Pittsburgh, at the screening station. This conveyor can feed either to the belt or to railroad hopper cars, which will be retained for standby purposes.

• **Pacific States Steel**—A blast furnace and related equipment at the Niles (Calif.) Works are designed to more than double capacity. The project is part of a $7 million program. Recently completed portions of the expansion include construction of a fourth open hearth furnace, acquisition of iron ore mines in Nevada and coal mines in Colorado and Utah; and establishment of a mill for producing rods, skelp, and wire products.

Fisher Body Expanding

Fisher Body Div., General Motors Corp., Detroit, will build a 154,000 sq ft addition to its plant at Janesville, Wis., raising total area to 607,000 sq ft. The first floor of the addition will provide about 129,000 sq ft of floor space for body and trim shops. New dry-

(*Please turn to Page* 74)

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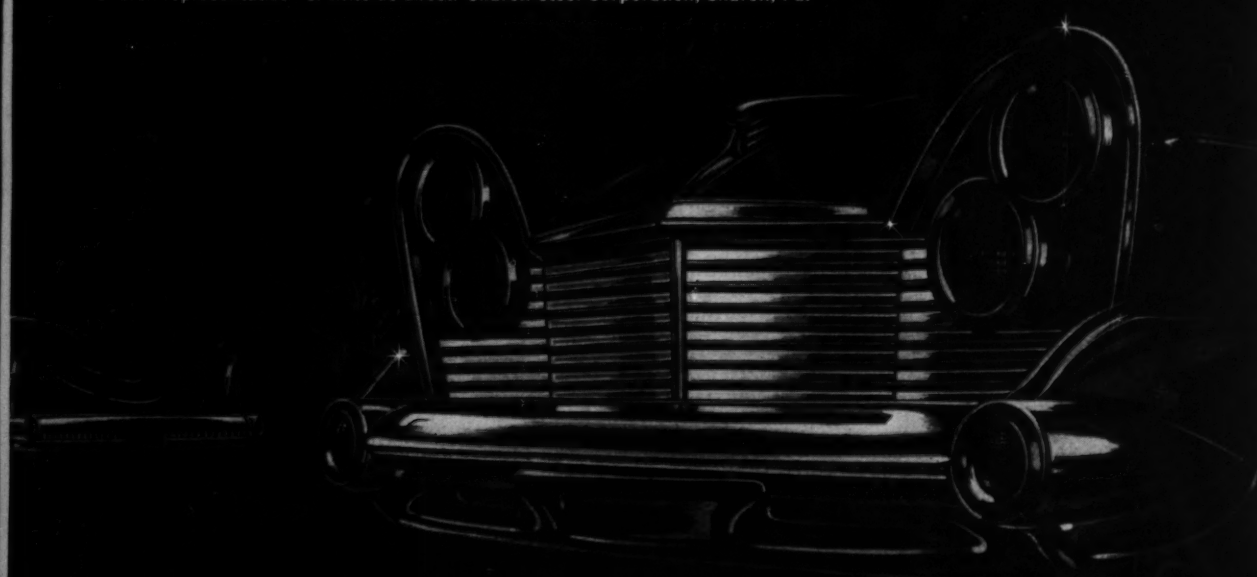

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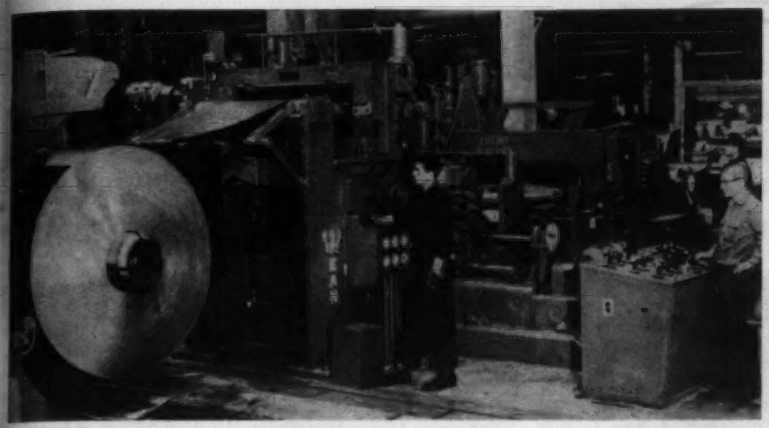

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(*Please turn to Page* 74)

CF&I WIRE HELPS PACKAGED for YOUR PRODUCTION

"CF&I Stem-paks cut machine loading time 80%... give us an extra hour of production every day," stated Mr. Frederick Voos, Plant Superintendent, Risdon Manufacturing Co., Waterbury, Conn.

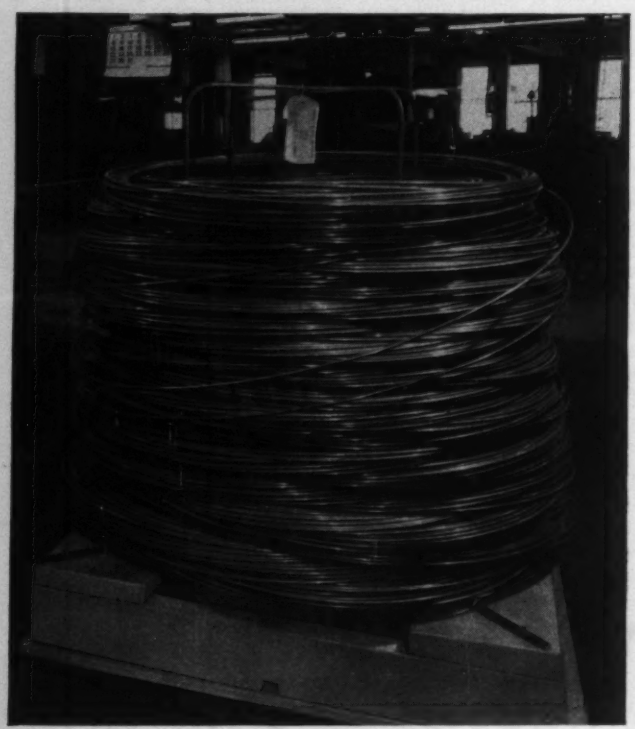
PROBLEM

1. "Our specially designed machines *were* fed wire from coils averaging 150 lbs. Because of the small size, frequent machine loadings were necessary. Each time, the coils had to be loaded by hand and the bindings clipped, after which the wire was guided through the straighteners before entering the machine. We were losing valuable production time due to excessive machine downtime," explained Mr. Voos.

SOLUTION

1. "Our Purchasing Department called a CF&I salesman who carefully examined our operation and recommended that we switch to CF&I Stem-paks which hold up to 1,000 lbs. of one continuous length of wire. Each Stem-pak feeds a machine for an average of one to two days... a production time equal to using seven coils with set-ups in the past.

"Stem-paks give us approximately an extra hour of production per day on each machine," Mr. Voos pointed out. "A Stem-pak can be set up in one-fifth of the time required for the seven coils of wire formerly used... *a saving of 80% on loading time.* The extra hour of production represents a 12½% increase in the operator's production time."



PROBLEM

2. "Part of our operation required the use of wire that was free from rust, grease or dirt. Too often, unprotected coils would collect dirt in transit or storage.

SOLUTION

2. "CF&I Fibre Drums are an ideal answer to the problem of unclean wire. The sturdy Fibre Drum has a metal cover and locking band which seals the drum, protecting the wire from grime and from corrosive elements. In addition, Fibre Drums hold up to 600 lbs. of one continuous length of wire which enables us to run our machines for a longer time than when we used small coils."

Stem-paks and Fibre Drums are just two of nine wire packages that CF&I offers to help make your operation more efficient and economical. When you order from

CF&I Stem-paks are delivered on pallets for fast unloading and easy in-plant handling by fork trucks.

INCREASE PRODUCTION 12½%

at Risdon Manufacturing Co., Waterbury, Conn.

Risdon Mfg. Co. also uses CF&I Fibre Drums, which hold up to 600 lbs. of wire, for special operations. The sealed Fibre Drums protect the wire against rust and contamination during transit and in-plant storage. Note how closely the Fibre Drums can be placed to the machine and how evenly the wire pays off.

A Stem-pak is easily placed in storage alongside Fibre Drums. No messy storage problems... no chance of coils becoming tangled. Inventory of this neat, compact storage set-up is a quick, simple counting job.

CF&I, you can specify wire *packaged for your production* to give you one or more of these benefits:

- **less downtime through extra-long continuous lengths of wire**
- **compact storage and simplified inventory control**
- **fast unloading and in-plant handling**
- **assured cleanliness of the wire**
- **smooth pay off of the wire**

A CF&I salesman will be glad to assist in selecting the *right* wire package for your operation. There's no charge for this service, so call our nearest sales office today.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

In the West: **THE COLORADO FUEL AND IRON CORPORATION**—Albuquerque • Amarillo • Billings • Boise • Butte • Denver • El Paso • Farmington (N. M.) Ft. Worth • Houston • Kansas City • Lincoln • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco San Leandro • Seattle • Spokane • Wichita

In the East: **WICKWIRE SPENCER STEEL DIVISION**—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

CF&I OFFICE IN CANADA: Montreal • **CANADIAN REPRESENTATIVES AT:** Calgary • Edmonton • Vancouver • Winnipeg 7021

GEAR PROBLEMS?

—check with FAIRFIELD!

GEAR PERFORMANCE to match the ever-increasing power and speed of modern machines is a Fairfield specialty. This is possible because Fairfield has long held a position of leadership in utilizing the most advanced methods, equipment, and techniques for producing better gears. By keeping apace with modern engineering trends, Fairfield renders an invaluable service to many of the nation's leading machinery builders.

If you have a gear problem, check with Fairfield. Our engineers are well-qualified to give you expert recommendations. CALL OR WRITE.

SPUR GEARS—Straight, helical, and internal. Sizes from 16 pitch, 1½" dia., to 1½ pitch, 36" dia.

HERRINGBONE—(Fellows Type). Sizes from 1½" to 15"

SPIRAL BEVEL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 28" dia.

STRAIGHT BEVEL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 28" dia.

HYPOID—Sizes from 1½" to 28" dia.

ZEROL—Sizes from 16 pitch, 1½" dia., to 1½ pitch, 21" dia.

WORMS AND WORM GEARS—Worms to 7" dia. Worm gears to 36" dia.

SPLINED SHAFTS—Lengths to 72".

DIFFERENTIALS—3,000 to 500,000 inch pounds capacity.

Note: All of the sizes above are approximate.

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MANUFACTURING COMPANY, INC.
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Ask for interesting, illustrated bulletin.

Gears and Differentials for FINE GEARS *Made to Order for:*

TRACTORS • HEAVY DUTY TRUCKS • AGRICULTURAL MACHINERY • POWER SHOVELS AND CRANES
MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

(*Concluded from Page 71*)

ing ovens and other paint department facilities will be housed on the second floor.

ASSOCIATIONS

National Association of Corrosion Engineers, Houston, elected these officers, effective March, 1960: President, G. E. Best, Manufacturing Chemists Association, Washington; vice president, E. C. Greco, United Gas Corp., Shreveport, La.; and treasurer, C. G. Gribble Jr., Metal Goods Corp., Houston. T. J. Hull is executive secretary.

National Association of Relay Manufacturers, Frederick, Md., elected these officers: President, R. M. Brumfield, Potter & Brumfield Div., American Machine & Foundry Co., Princeton, Ind.; vice president, V. A. Hedlund, RBM Div., Essex Wire Corp., Logansport, Ind.; secretary, R. P. McAlister, Leach Relay Corp., Los Angeles; and treasurer, H. B. Steinback, Magnecraft Electric Co., Chicago.

Automotive Undercoating Manufacturers Association, Pleasant Ridge, Mich., elected these officers: President, D. W. Maher, Minnesota Mining & Mfg. Co., St. Paul; vice president, G. R. Widger, Tuff-Kote Asphalt Products Inc., Warren, Mich.; secretary, M. Jelin, Lewis Asphalt Engineering Corp., New York; and treasurer, H. E. Hutson, Gibson-Homans Co., Cleveland.

NEW ADDRESSES

Costello Engineering Corp., manufacturer of pipe and tube bending machinery, moved to larger quarters at 1150 W. 135th St., Gardena, Calif.

Airborne Instruments Laboratory, a division of Cutler-Hammer Inc., Milwaukee, moved to Deer Park, N. Y.

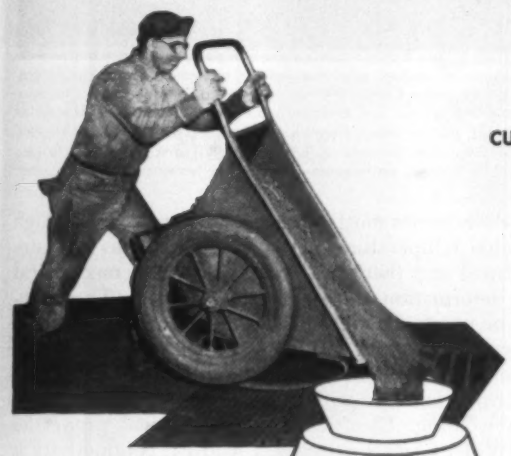
Flotrusion Div. of Darco Industries Inc., was moved from Glendale, Calif., to Manhattan Beach, Calif. Darco is a subsidiary of **United States Chemical Milling Corp.,** Manhattan Beach. The move brings

SAVE $36.00 a ton on cast iron chips

New Whirl-Air-Roxy method delivers chips from Machine Shop to Cupola *(patented)*

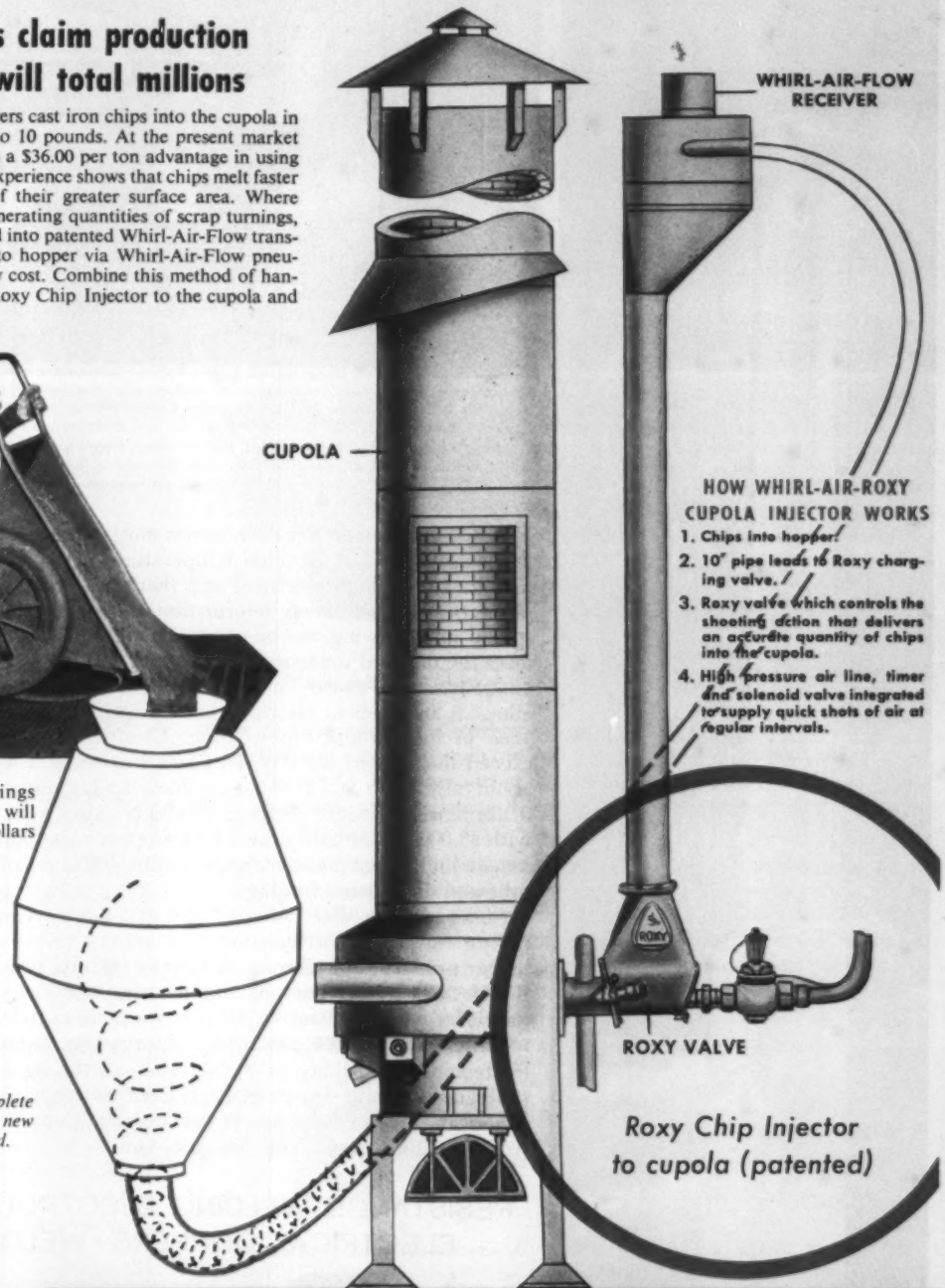
Foundries claim production savings will total millions

New Roxy valve delivers cast iron chips into the cupola in measured shots of 7 to 10 pounds. At the present market value of scrap there is a $36.00 per ton advantage in using chips. Also, foundry experience shows that chips melt faster than scrap because of their greater surface area. Where machine shops are generating quantities of scrap turnings, they can be discharged into patented Whirl-Air-Flow transporter and delivered to hopper via Whirl-Air-Flow pneumatic conveyor at low cost. Combine this method of handling chips with the Roxy Chip Injector to the cupola and



you will achieve savings that foundrymen say will amount to a million dollars in very few years of operation. The Whirl-Air-Roxy method is easily applied to any size foundry; small, medium or large. Initial cost is low and savings will pay for installations in a period of a few months. We invite your exploratory inquiry.

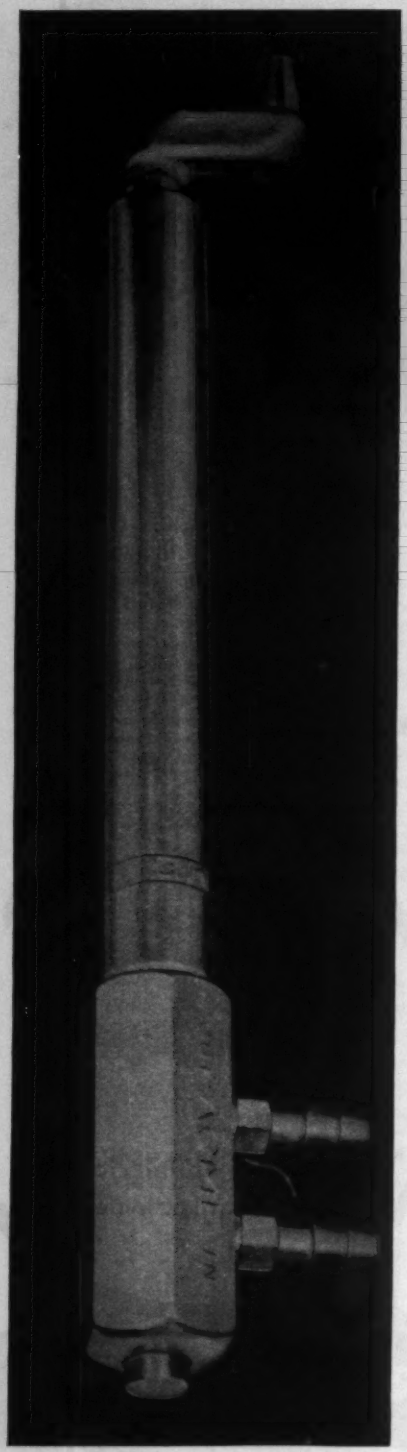
Write or wire for complete information on the new Whirl-Air-Roxy method.

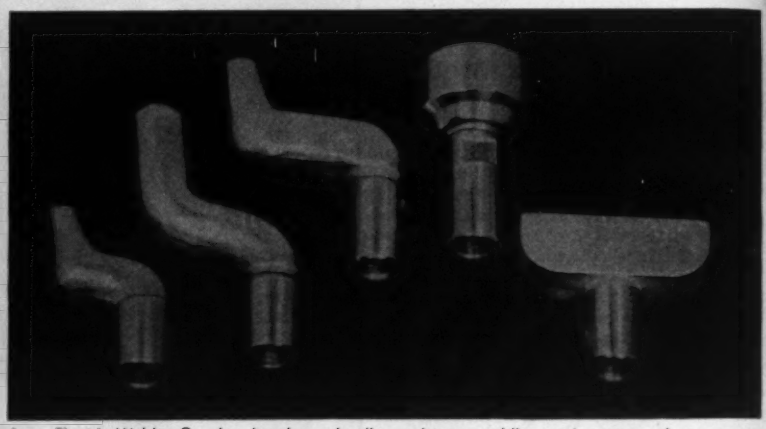

WHIRL-AIR-FLOW RECEIVER
CUPOLA
HOW WHIRL-AIR-ROXY CUPOLA INJECTOR WORKS
1. Chips into hopper.
2. 10" pipe leads to Roxy charging valve.
3. Roxy valve which controls the shooting action that delivers an accurate quantity of chips into the cupola.
4. High pressure air line, timer and solenoid valve integrated to supply quick shots of air at regular intervals.
ROXY VALVE
Roxy Chip Injector to cupola (patented)

WHIRL AIR FLOW PNEUMATIC CONVEYORS

WHIRL-AIR-FLOW

SPOT-WELDING TIPS and electrodes of Chromium Copper-999 give superior service in high production resistance welding





Acme Electric Welder Co., Los Angeles, a leading resistance welding equipment manufacturer, produces standard spot-welding tips from Chromium Copper-999 rod, seam-welding wheels from Chromium Copper-999 sheet. Irregular shaped tips, above, are Anaconda die-pressed forgings of Chromium Copper. In pieces fabricated from rod, bar, or sheet, strength and hardness are increased by cold working after heat treatment. Anaconda gives forgings an additional cold strike after hot forging to increase surface hardness. *Left:* A forged welding tip in an Acme water-cooled tip holder.

IN resistance welding the electrodes must carry heavy currents under high pressures and at elevated temperatures. They must be made of materials that have high electrical and thermal conductivities and mechanical properties that will keep deformation and wear to a minimum. The widespread and growing use of resistance welding has stimulated research to meet the demand for more efficient and durable electrode materials.

CHROMIUM COPPER-999, one of Anaconda's high-strength, heat-treatable alloys, is an excellent electrode material with a record of superior performance in high-production welding. Electrical and mechanical properties exceed those listed for RWMA Class 2 material. Electrical conductivity is about 80% IACS and thermal conductivity is comparably high. In addition it has tensile strength of about 70,000 psi after heat treatment (compared with 48,000 psi for hard drawn ETP Copper), and its mechanical properties remain high at temperatures approaching 400 C. Available as rod, bar, sheet, tube and die-pressed forgings.

Anaconda also offers Hitenso®-961 as a more economical electrode material for use where service conditions are not severe enough to require the higher properties of Chromium Copper-999. Its properties exceed those of RWMA Class 1 material, having electrical conductivity of about 85% and tensile strength of about 60,000 psi. Available as rod, bar and plate.

TECHNICAL ASSISTANCE. For further information on these Anaconda alloys or for technical assistance in the selection of the right alloy to meet special problems, see your American Brass Company representative. Or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

5981

RESISTANCE WELDING ELECTRODE MATERIALS
ELECTRICAL COPPERS • WELDING RODS

ANACONDA®

PRODUCTS MADE BY THE AMERICAN BRASS COMPANY

the division into the central USCM manufacturing area and provides space for construction of additional facilities.

NEW PLANTS

International Harvester Co., Chicago, will construct a motor truck parts depot at the intersection of Meyer Road and Moeller Road, Ft. Wayne, Ind. The building will contain 625,000 sq ft and is scheduled for occupancy Nov. 1, 1960.

Deltec Inc. is completing a 6000 sq ft plant at Youngstown for the manufacture of oil country machines, light plant machinery, and automation equipment. Cost: About $150,000. The firm recently sold its old plant to McKay Machine Co. which is enlarging it.

NEW OFFICES

Construction Equipment Div., **International Harvester Co.**, Chicago, established these regional offices: 10 E. 40th St., New York; Melrose Park, Ill., under A. W. Meyer, North-Central regional supervisor; 1809 S. Lamar St., Dallas, with L. E. Muzzy as Southwest regional supervisor.

Cutler-Hammer Inc., Milwaukee, opened a sales office in Allentown, Pa., with E. E. Crouthamel in charge. The office is being operated as a branch of the firm's Philadelphia district sales office.

Aluminum Co. of America, Pittsburgh, opened a sales office at 180 S. Broadway, White Plains, N. Y. Walter H. Close is manager of the office. The firm moved its Richmond, Va., branch sales office to 908 N. Thompson St.

L. S. Starrett Co., Athol, Mass., opened an integrated sales office and warehouse building at 48 Commerce St., Springfield, N. J.

RCA Semiconductor & Materials Div., Radio Corp. of America, New York, established a Southwest district sales office at 7905 Empire Free-

(*Please turn to Page 80*)

ON YOUR FASTENING PROBLEMS!

If slow-downs in assembly operations are jinxing your production schedules, you can be sure they aren't caused by "voodoo"! But what about the fasteners you are using? If they are not accurate and uniform, they can cause costly bottlenecks.

Fischer helps solve fastening problems by supplying *precision turned brass and aluminum nuts* . . . standards, specials, odd sizes or shapes and miniatures . . . to meet individual needs. And to assure reliable performance, all Fischer turned nuts are produced to closer tolerances than required by American Standard B18.2-1955 specifications. Fischer also specializes in dependable "on schedule" deliveries and competitive pricing. *That's why FISCHER is your best source for precision nuts.*

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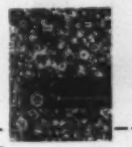

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Please send Catalog FS-1000 and price lists for Fischer Turned Nuts.

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This is the largest installation of soaking pits ever built at one time. It will heat an average of 750 tons of ingots per hour. At peak capacity, it will fill the ingot buggies at a rate of 1200 tons per hour.

Worldwide engineering and manufacturing facilities through associates in Australia • Belgium • France • Germany • Great Britain • Italy • Japan

■ Forty-eight soaking pits on *one order*. There's a bold act of customer confidence for you! Confidence in the future, for one thing. Confidence in the principle of the Surface one-way fired soaking pit with the jet pump recuperator system. Many other steelmakers have shown similar faith in Surface—a source of pride, matched by our determination to deserve it,

wherever heat is used in industry

48 PITS

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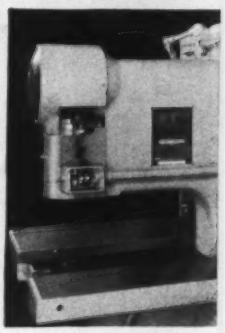
A Division of Midland-Ross Corporation

Surface

NEW... IMPROVED... model 15A

the STRIPPIT FABRICATOR

for high-profit, low-cost punching, notching and nibbling... for prototype, short and medium production runs



FEATURING the new *Strippit Electro-Hydramatic Head* — simplified design . . . minimum number of parts . . . needs no pressurized air. Makes the 15A easier to install, simpler to maintain, more economical to operate.

punches
any round or shaped hole up to 3½" diameter in sheet material — up to ¼" mild steel.

notches
90° corners — rectangular, radii, vee and special shape edge notches — up to ⅛" capacity in mild steel.

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straight line or contour shearing up to 38" diameter circle, at 165 strokes per minute, ⅛" mild steel.

accurate, quick-set gauging
a unique, multiple-stop system for exact work positioning to any layout specifications — *in seconds.*

quick-change punches and dies
from one size to another in less than 20 seconds — within easy reach in labeled, built-in file drawers.

easy conversion
to a high speed production punching unit with the Strippit Duplicator and the Dupl-O-Scope or Microbars to punch Duplicator templates.

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for new Catalog 15A and demonstration at your own plant of the capabilities of this high-profit fabrication system.

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WALES **STRIPPIT** INC.

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In Canada: Strippit Tool & Machine Company, Brampton, Ontario

(*Concluded from Page 77*)

way, Dallas, Tex. Julius S. Lempner is field engineer, R. T. Marconi sales representative.

CONSOLIDATIONS

Aluminum Co. of America, Pittsburgh, purchased **Rea Magnet Wire Co. Inc.**, Ft. Wayne, Ind., manufacturer of copper magnet wire. Alcoa hopes to achieve "significant advances in the development of aluminum in the magnet wire field" as a result of the acquisition.

Federal Pacific Electric Co., Newark, N. J., will acquire **Cornell-Dubilier Electric Corp.**, South Plainfield, N. J., subject to approval by stockholders.

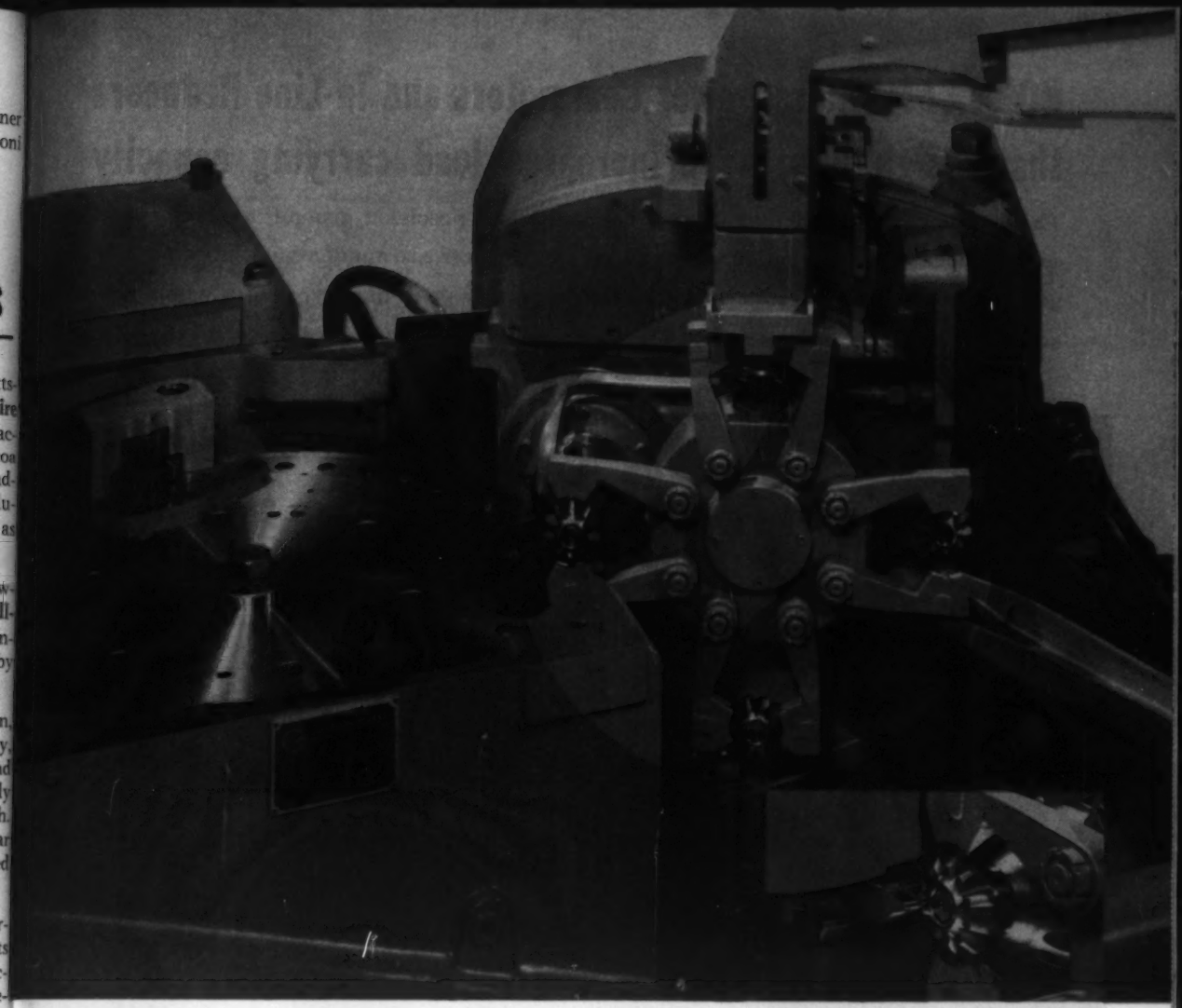
McJunkin Corp., Charleston, W. Va., will absorb its subsidiary, **Chandler-Boyd Co.**, Pittsburgh, and will operate the industrial supply firm as its Pittsburgh branch. McJunkin is a distributor of tubular goods, valves, fittings, and related items.

Automation Industries Inc. (formerly Automation Instruments Inc.), Manhattan Beach, Calif., acquired **Ultrasonic Testing & Research Laboratory**, Van Nuys, Calif., and will operate the property as a division.

Challenge Mfg. Co., maker of truck mixers, plaster guns, concrete finishers, and trenching machines, merged with **Cook Bros. Equipment Co.**, maker of heavy duty trucks and truck equipment. Both firms have headquarters in Los Angeles. The consolidated firm, Challenge-Cook Bros., will maintain general offices at 3334 San Fernando Rd., Los Angeles 65, Calif.

Servo Corp. of America, New Hyde Park, N. Y., maker of electronic instruments and systems, acquired **Electro-Pulse Inc.**, Culver City, Calif., producer of electronic test equipment.

Kelsey-Welding & Engineering Corp., a newly organized subsidiary of Snap-on Tools Corp., is acquiring **H. R. Kelsey Welding & Engineering Co.**, all of Kenosha, Wis.



In Revacycle Method each blade of cutter is longer than its predecessor; there is no depthwise feed of cutter itself. One rotation of the cutter completes each tooth from the solid.

Fastest way yet to cut straight bevel gears

If you're looking for a faster, fully automatic way to cut straight bevel gears and pinions with conjugate surfaces and localized tooth bearings, consider the Gleason No. 109 Straight Bevel Revacycle® Machine.

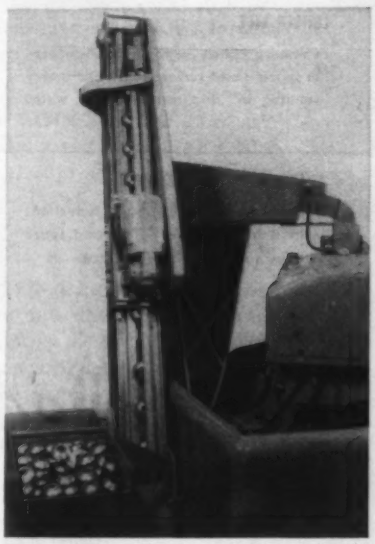
You rough, semifinish, and finish a gear from the solid blank with a single rotation of the Revacycle cutter.

Now both 21″ and 25″ diameter cutters can be used on the No. 109 Revacycle Machine. The 25″ cutter cuts gears to a maximum depth of 0.600″. The 21″ cutter will cut to a maximum of 0.400″.

A new, completely automatic mechanism loads and unloads each gear. You can feed this loader manually or with a conventional belt conveyer.

The No. 109 Machine handles a wide range of automotive and farm machinery gears: up to 10″ diameter, 5:1 ratio, 1¼″ face width.

Send for our bulletin for information on both the machine and the Revacycle Method.



Storage unit and flight conveyer can be fed manually or with belt conveyer. Even with manual operation, one operator can handle a battery of machines.

GLEASON WORKS

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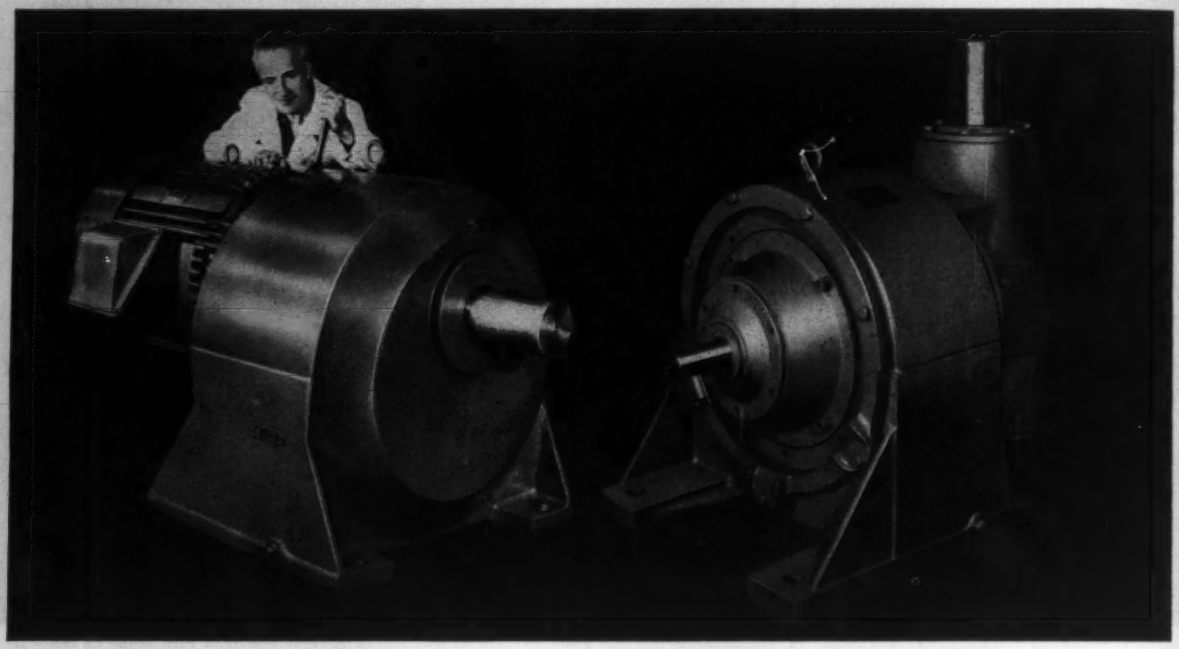
NOW... high horsepower Gearmotors and In-Line Reducers that weigh less, have increased load carrying capacity

The gearing in these drives is case hardened and precision ground, a development so advanced that conventional standards and ratings are suddenly out-of-date. You get commercial gear drives with gearing of master gear quality, plus a whole new set of engineering advantages. They are available in standard sizes to 200 H.P.



(Left) 75-HP GEARMOTOR.
Application: heavy duty machine tool drive.

(Right) 50-HP IN-LINE REDUCER with right angle attachment.
Application: conveyor drive.

LONGER LIFE

Extreme accuracy of tooth profiles, profile spacing and surface finish eliminates "running in" and resulting gear wear.

HIGHER SPEEDS

Dynamic load factors are reduced. Reducers operate at higher speeds, have increased load carrying capacity.

REDUCED VIBRATION

Reduced tooth to tooth errors, accumulated pitch errors and total composite errors give smoother contact.

SPACE AND WEIGHT SAVINGS

Harder materials, plus major reductions in load factors, save weight and space without sacrificing performance.

REDUCED SOUND LEVELS

For applications where low sound levels are important, gear noise is no longer a controlling factor.

100% INTERCHANGEABILITY

Duplicate units or spares can be installed with original manufacturing tolerances duplicated exactly.

Write today for catalog GM-60

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INDUSTRIAL GEARS & SPEED REDUCERS • LIMITORQUE VALVE CONTROLS • FLUID MIXERS • FLEXIBLE COUPLINGS

VEST POCKET TUBE— Only ¾ in. long, a new electron tube will soon become a part of space vehicles, television sets, radios, TV cameras, and computers. So predicts Douglas Y. Smith, vice president and general manager, RCA Electron Tube Div., New York. Called the "Nuvistor," the miniature tube now is in the evaluation stage —more than 250 electronic equipment makers will try it out. Initial commercial production is scheduled for sometime this year.

ELECTRONIC'S OUTLOOK— RCA's Douglas Y. Smith says the electronics industry is regarded as having the fastest growing business in the world. "It is expected to increase its earnings from the present $14 billion to $16 billion in 1960 and to $25 billion in 1965."

NEW COLUMBIUM ALLOY— A medium strength alloy, Cb-65, holds 37,000 psi at 1800° F, states Union Carbide Metals Co., a division of Union Carbide Corp., New York. It's first of a family. Goal: 40,000 psi at 2200° F.

UNIVERSAL BOX—Prototypes of a new size shipping container are being tested by the Department of the Army. The maker, Highway Trailer Co., New York, says they come in lengths up to 40 ft. Object: Modules of varying lengths, all 8 ft by 8 ft.

HOT MOTOR— An electric motor that operates at 1300° F has been developed by the Research Laboratories Div., Bendix Aviation Corp., Detroit.

HOT SPOT— Scientists at Bell Aircraft Corp.'s laboratories in Buffalo are developing a device capable of generating temperatures almost twice as high as the sun's surface. It will be used to test materials for satellites and space ships. A plasma jet generator, it uses a high intensity arc to separate the molecules in gases, then expels the charged particles with great force. As the gas particles recombine, the energy of reassociation produces temperatures to 18,000° F.

SUPERCOLD ADHESIVES—In joining metals, the epoxy phenolics give the best results at temperatures down to minus 424° F, says the National Bureau of Standards. Tests were carried out at the laboratories at Boulder, Colo.

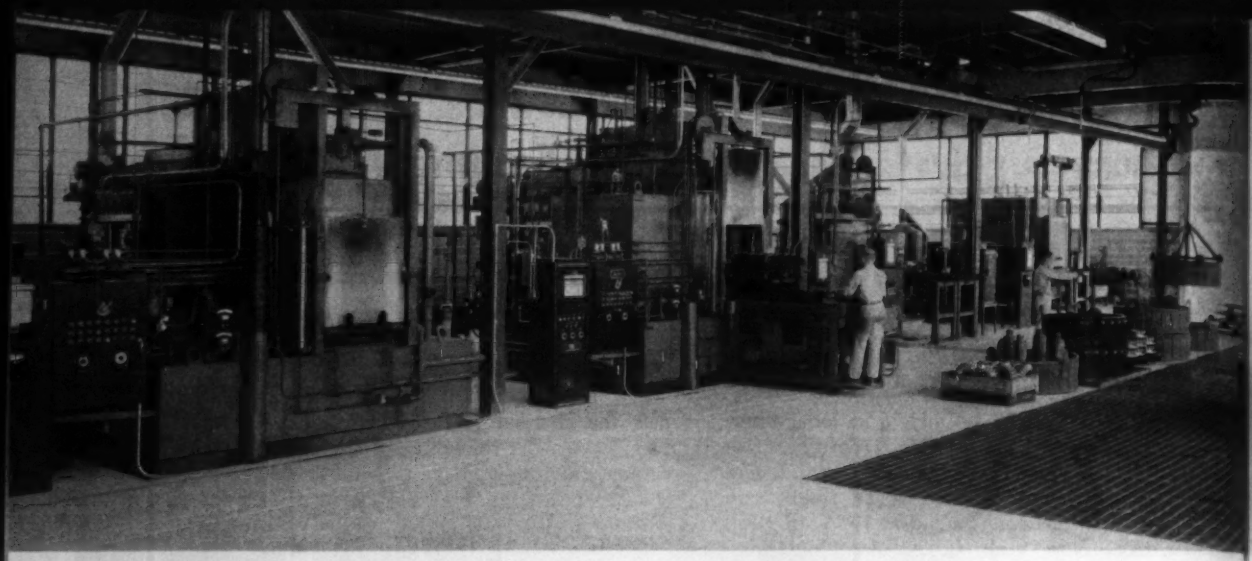
EXPORT THE ATOM—Building and marketing atomic reactors in France are the goals of a joint venture of Atomics International Div., North American Aviation Inc., Los Angeles, and two French companies. It will be called Dynatom.

POWERFUL AIR MOTOR— A 150 lb starter motor for an aircraft nuclear powerplant develops 500 hp, says General Electric Co., Schenectady, N. Y. It can be mounted in the front bullet nose of an engine.

BEARING BARRIERS— Fatigue failures, a longtime bugaboo of rolling contact bearings, will be studied by using materials made of zone refined and quadruple-vacuum melted steels. The object: To eliminate microscopic particles 0.050 to 0.100 in. below a surface which may act as stress raisers. Material cost could exceed $3000 per cubic inch.

GENERATOR KEEPS GOING— The pint size atomic generator unveiled a year ago at the White House is still working, says the Nuclear Div., Martin Co., Baltimore. It was supposed to last only 140 days.

EDUCATED COMPUTER—Engineers have started giving college rules and data to a computer at General Motors Corp., Detroit, to simplify engineering programing. Problems can then be described in terms like masses, springs, and dampers, rather than complex mathematical terms.



Exceptional uniformity, speed, and flexibility are provided by power convection in this mechanized line of standard rated furnaces. Cycle time is cut drastically, even when gears and pinions are closely packed

Computer Aids in Design Of Gale Velocity Furnace

Heat transfer in convection type furnace is dependent on temperature difference between source and work, also on the velocity of air movement. Problems not important at lower speeds have prevented progress

A COMBINATION of new equipment designs and the use of computers in furnace calculation is paying off for Surface Combustion Div., Midland-Ross Corp., Toledo, Ohio. Result: A new line of furnaces with gale velocity air circulation, offering rapid heating rates, increased load densities, and uniformity of heating.

• **Role of Computer**—As heating rates and air velocities rise, the problems associated with furnace design become increasingly complex. At low circulation rates, simple fans and calculations have sufficed, and many furnaces have been designed by rule-of-thumb procedures, or even on the basis of: "We did it that way once, and it worked." But higher air flow rates lead to thermodynamic and aerodynamic problems which are difficult to solve by manual methods.

Mere increase of horsepower on the furnace fan does not necessarily aid in heat transfer. The fan may spin faster—though there is a limit. Fans may vibrate severely, or even shake themselves apart, but if the higher fan speed does not produce a corresponding increase in the atmosphere velocity, the horsepower is wasted.

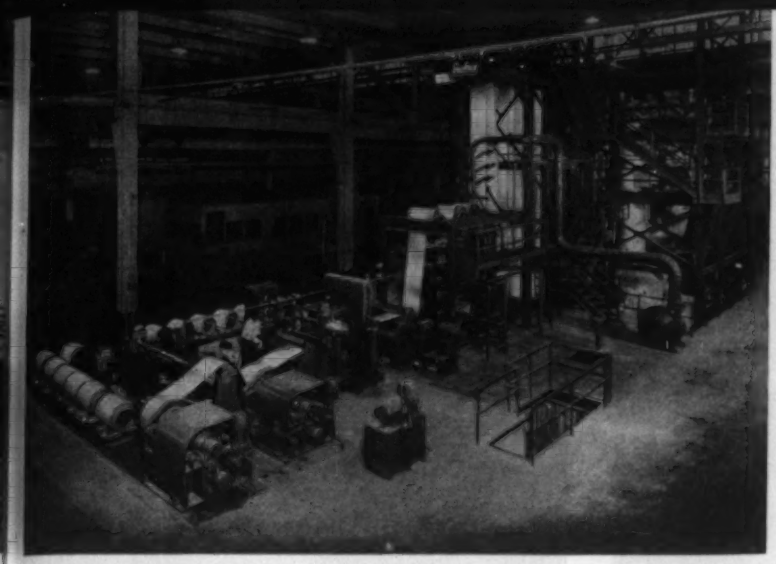
True, the energy lost to the fan shows up in the furnace as additional heat, but it is an expensive way of using electric power as a heating medium. So the fan must be calculated for the higher velocity; the air flow pattern must be taken into consideration; and construction materials must be re-evaluated.

When those things are done, says Dr. John Turin, consultant to Surface and a professor at the University of Toledo, the heat transfer rates in the furnace are limited not by our ability to produce and distribute the heat but by the physical capability of the work to absorb it. Heat can be supplied as rapidly as needed and the total cycle calculated for maximum effectiveness. Although the furnaces become more complex, they offer greater output per dollar of invested capital and per unit of floor space, Dr. Turin remarks.

• **What's Involved**—Surface makes no claims that the new developments have changed any of the physical laws governing heating—heat is still transmitted through conduction, convection, and radiation. Industrial furnaces usually depend on convection and radiation; conduction is involved in the transfer of heat from the surface of the metal to the inside.

Radiation has been widely used for heating. Heat transfer by this means is based on Wien's law: The amount of heat transferred is proportional to the area exposed to the heat source, and also proportional to the difference between the fourth powers of the temperatures of source and object.

The law is strictly true for "black body" radiation only; if the work surface is polished, for example, it



Power convection is designed to heat this brass strip continuously at speeds up to 200 fpm. Wind velocities of 136 mph provide the temperature uniformity required to control strip grain size from edge to edge

will reflect more of the heat, and thus will heat more slowly than the radiation law indicates. So when light and dark objects in the same load are heated by radiation, they have different heating rates. Heat losses by radiation follow the same rules; if you hold your hand near the dark bottom and the chromium plated sides of a teakettle of boiling water, the difference in radiation can be felt—the bottom *seems* hotter, although the water inside may be uniformly heated.

In furnace considerations, radiation has other disadvantages. One part may shield another from the radiating source, so that it heats much slower; the principle is used in the cold wall furnace designs. If a high heat head is used to obtain more rapid heating of the load, small parts or projections from larger pieces may overheat before the larger units come to the desired temperature.

High head radiation heating does offer advantages of simplicity and convenience for much work, particularly of simple sections or continuous lengths. The less the temperature head used, the easier are the controls required. But a smaller head will reduce the heating rate; the designer must consider both factors. Further, the maximum heating rate is governed by the fact that the radiating surface is limited in its temperature. In industrial heating, the commercially available heating and insulating materials are the limits in the top temperature which can be used in the furnace.

• **Convection Problems** — In heating by convection, the temperature head may be less than is the case for radiation and still provide rapid heating, provided the circulation rate is sufficiently high. In effect, the circulating atmosphere picks up heat from the source and carries it to the work, recycling to the heat supply for more. Since the mass of air in the furnace is small compared with the mass of work, heating by convection is governed by the amount of circulation which can be provided. High circulation rates are desirable if short heating cycles are to be obtained.

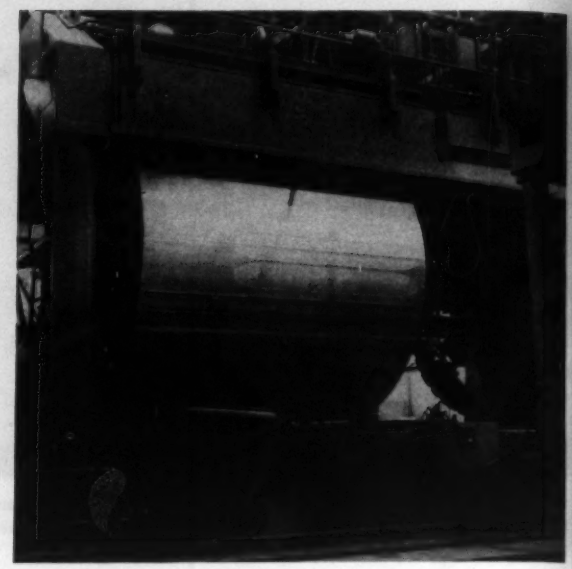
Heat distribution through the load is dependent on the velocity of the circulating atmosphere and also on the way it is distributed through the load and furnace chamber. But if the circulation is sufficiently high, the head between the heat source and the work can be small. As in the case of radiation heating, control of the work temperature is easier when the difference between the source and work is reduced.

It would seem that the problem of increasing the circulation rate is a matter of increasing the power applied to the fan. Unfortunately, that is an oversimplification. It applies to relatively low circulation rates, but as rates increase, aerodynamic problems arise. Simple paddle type fans must be replaced by units designed as airfoils; peripheral speeds become high, so creep must be considered; and the ducts or channels carrying the heated atmosphere must be designed for the higher velocity flow. Baffles must be carefully considered, and the location of the fan in the ductwork or in the furnace chamber itself is of major consequence. In effect, the furnace assembly is also a wind tunnel. So the devices which are introduced to carry or support the work also modify flow patterns.

• **Computer Needed**—It would be too costly to handle all calculations for the design of high circulation furnaces by manual methods. Surface found an answer: A computer. The machine has 84 memory registers, each capable of storing as many as 31 digits, and automatically handles the decimal points. It does addition and subtraction at the rate of 214 per minute, multiplies and divides 40 times per minute, and will calculate square roots at the rate of 27 per minute. With the equipment, it was possible to study many of the conditions affecting furnace design and heating rates, to determine the fan conditions and to develop basic design data for a wide variety of conditions. The calculations were verified by experimental checks.

Cooling is the inverse of heating, with the heat being transferred from the work to the atmosphere, and from the atmosphere to some type of heat absorption system. So the same principles apply, and the use of the high powered convection system will also make it possible to cool work faster than had been the case by other means. The approach will be particularly helpful where it is necessary to obtain a high cooling rate but where water or oil quenching is not permitted.

• **Predictions Important**—The most valuable aspect of the theoretical studies: The ability to predict, with considerable accuracy, the results of applying the high circulation principle to industrial problems. Without such aid, furnace design would be greatly slowed, and individual tests of a furnace series might be required to estimate each new job.



Welding machine, built by Air Reduction Co. Inc., New York, joins curved plates to form the cylinder of first stage fuel tanks. Welding head is atop the machine

Aluminum Extrusions Make a Missile Skin

Martin Co. engineers build the Titan with production techniques that have since been adopted by other missilemakers. The material: 2014 aluminum

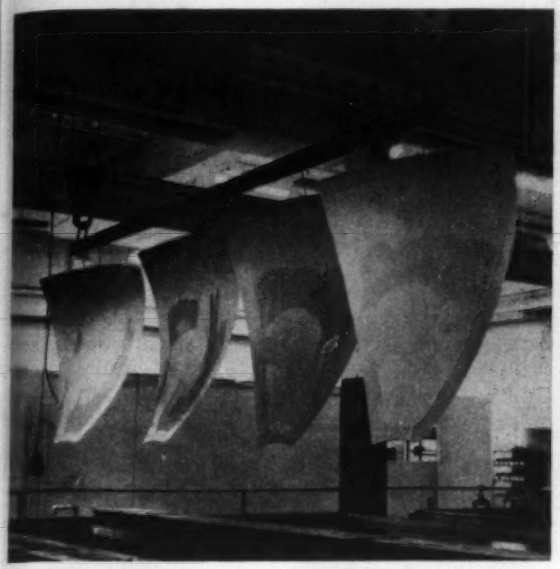
TITAN, one of the country's two ICBMs, begins as some simple aluminum sheets and extrusions.

Techniques for building the 98 ft airframe were developed by Martin Co. (Denver) engineers with the help of suppliers.

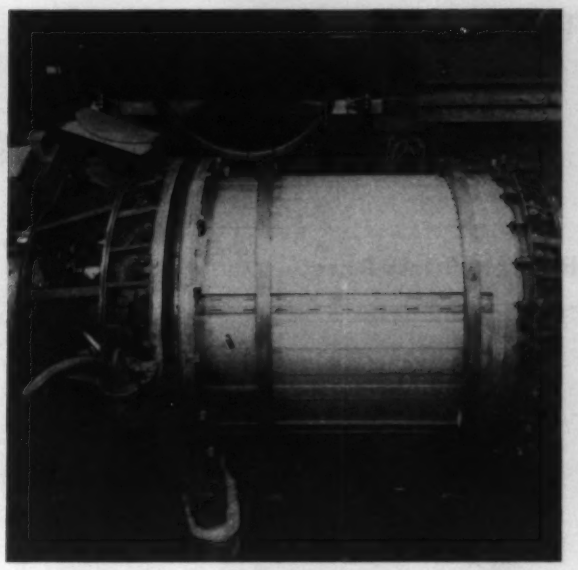
Integrally stiffened extruded plates (up to 18 ft long) are received semihard from the mill. To arrive at final thickness tolerances, production men first run the plates through a Giddings & Lewis tape controlled mill that machines the flush surface and then the flats between the T-shaped stringers on the reverse side. Result: A skin about 0.150 in. thick.

Machined sections go to a Hufford biaxial stretch press that relieves residual stresses and forms the radial curvature in the panels. Curved panels are chemically milled, taking metal off less critical areas.

Engineers (at left) get set to run a system test on a finished Titan in one of the 13 story, vertical test cells



After this chemical milling operation, the pie shaped sections of 2014 aluminum will be welded into a tank dome. Chemical milling tolerances are held to ±0.005



Two domes, held in chucks, are positioned to the tank walls. As the fixture and chucks rotate, the welding head makes the circumferential welds in a continuous pass

• **Huge automatic Airco welding machines and fixtures simplify a pernickety fabrication job.**

Panels are mounted on a locating fixture in groups of three. Fingerlike pneumatic clamps grip the internal stringers to hold the plates in position. Then the fixture moves under a welding bridge, and an automatic welding head traverses the longitudinal seams at about 9 in. a minute. The problems of welding the aluminum alloy have been solved with an inert gas shielded, tungsten arc with aluminum filler wire. An aluminum chill bar backs each side of the butt joint to dissipate weld heat and give the weld joint required tensile strength. Under the joint, in the puddle area, the back-up bar has a 0.050 in. undercut steel plate. Its purpose: To prevent adhesion of the part to the fixture.

After four of the welded subassemblies are completed, they are clamped into position on the fixture and moved under the welding bridge where they are joined to form a complete tank cylinder.

• **Domes are welded on a turntable.**

Tank ends are made from wedge shaped "orange peel" sections. After they have been trimmed, aged, and chemical milled, the sections are put on a dome shaped positioner that can be rotated and tilted. The welding head is supported on a boom and is moved into position to weld the segments from apex to base of each of the segment joints. After segment welding is completed, the turntable is rotated 360 degrees while the dome edge is routed to size.

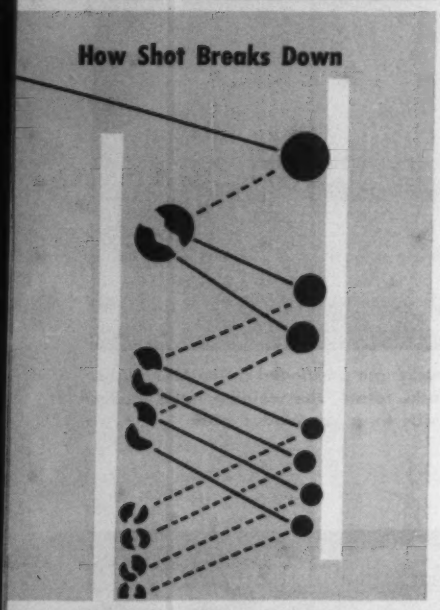
Domes and tank cylinders are joined on a rotating positioner that consists of a bed, two rotary holding chucks, roller rings, and an automatic welding head. Two dome assemblies are clamped in the chucks, and the cylinder is positioned in the roller rings. As the fixture rotates, the welding head makes each circumferential weld in a continuous operation.

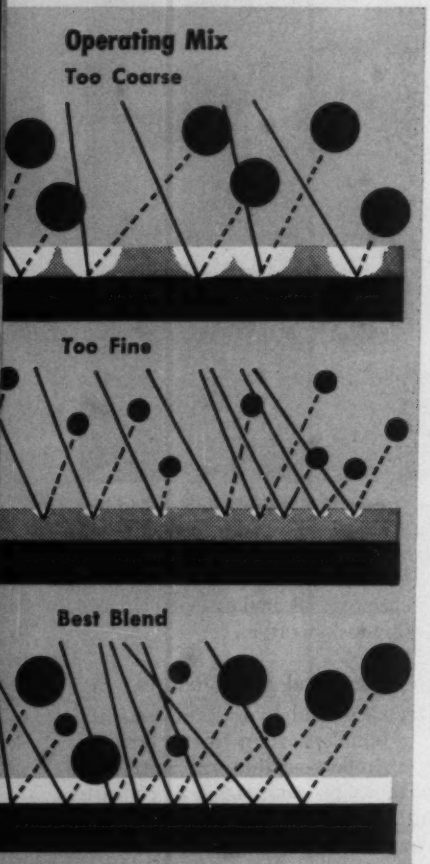
In the assembly area, tanks are joined with cylindrical skirts; first and second stages are joined with tapered transition pieces, and all other components are installed

• **Tanks are joined in horizontal splice fixtures.**

After the tanks pass x-ray and hydrostatic tests and have been cleaned, assemblers align them optically with the connecting members—cylindrical skirts join the oxidizer and fuel tanks for each stage; a truncated cone makes the transition from the 10 ft diameter first stage to the 8 ft diameter second stage.

Metal Abrasive Producers Put Accent on Performance





MAKERS of metal abrasives for blast cleaning and peening are putting stronger emphasis on research and quality control.

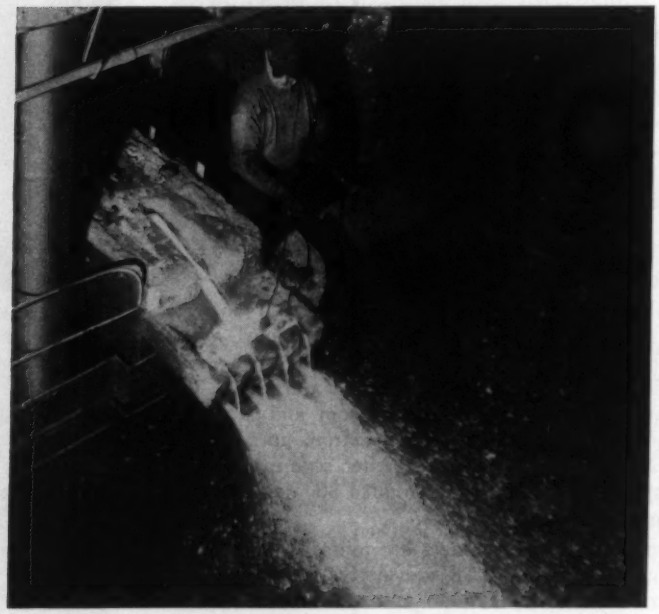
Many producers are expanding their facilities to meet increased demand, but their greatest concern is the reduction of over-all cleaning costs. They're making every effort to develop materials that will last longer and clean faster. They are trying for better coverage and more uniform blasting. And they are looking for ways to reduce maintenance costs.

• Most companies subject their products to rigid quality control procedures and work constantly for product improvement. One firm makes and tests small batches of abrasive in a pilot plant.

Abrasive makers don't always agree on the best material for shot or grit, but each tries to keep its product uniform. Several keep detailed statistical records to correlate manufacturing procedures with performance. Example: Cleveland Metal Abrasive Co., Cleveland, identifies each bag or box of material by heat, heat treatment, and production date. Chemical analysis of each heat produced is carefully controlled and recorded. Results of heat treatment are checked microscopically.

Equipment that simulates melting, heat treating, and wear conditions is showing up in some laboratories. A pilot plant that includes a 200 lb, electric arc furnace and heat treating furnaces to handle small batches permits Wheelabrator Corp., Mishawaka, Ind., to test new materials and techniques before they are used in production. A breakdown tester faithfully duplicates wear conditions that will be encountered in shot blasting equipment.

Producers admit that more sophisticated quality control programs have boosted abrasive costs, but

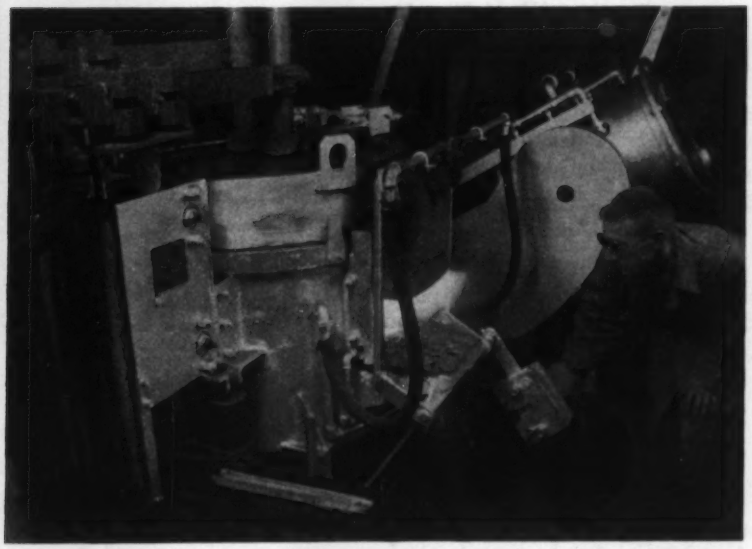


Molten metal disintegrates as it is sprayed with high pressure water at Metals Disintegrating Co. Inc. Unused sizes are crushed for grit

Metallurgist studies microstructure of an abrasive specimen in Cleveland Metal Abrasive's new research, development, and service laboratory

they say more efficient cleaning and peening have more than offset higher prices.

Pittsburgh Crushed Steel Co., Pittsburgh, has quality control and research facilities at its Pittsburgh plant and at Globe Steel Abrasive Co., a Mansfield, Ohio, subsidiary. The company has also maintained a research program at Battelle Memorial Institute, Columbus, Ohio, since 1937.



Experimental batches of steel shot are produced in Wheelabrator's pilot plant. The setup simulates the company's production operation

• Abrasive materials vary; some users prefer chilled iron for faster cleaning, or malleable iron because it's easier on machinery.

Chilled iron was the first material used for shot and grit. Pittsburgh Crushed Steel says it started making metal abrasives in 1888, and its subsidiary, Globe Steel Abrasive, has been in business since 1907.

Metals Disintegrating Co. Inc., Elizabeth, N. J., says it was turning out iron abrasives before 1918, in a plant at Amesbury, Mass. The company still produces chilled iron abrasives for metal blasting, granite cutting and finishing, and for chemical reactions.

Some say chilled iron offers faster cleaning than other abrasives. It is said to be less durable than other materials, and machines using it are more expensive to maintain because of faster wear. But its cleaning rate and low initial cost make it desirable in some applications (especially where abrasive recovery is low). Abrasive Shot & Grit Co. Inc., Springville, N. Y., recommends its type shot and grit for cleaning

steel before it is fabricated, or to remove sand from castings.

Some companies say annealed iron abrasives, with higher durability and lower machine maintenance cost, more than make up for their higher cost in jobs where abrasive is recirculated, and leakage isn't a problem. Einar Borch, vice president, National Metal Abrasive Co., Cleveland, says the abrasive user should choose material that offers the best combination of cleaning ability, speed, long life, and low equipment maintenance costs. His company makes a pearlitic malleable iron that contains hard iron carbide particles. They do the cleaning. The soft iron matrix is said to cut machine maintenance. The company also offers the material in a harder, heat treated form.

• Some companies say steel abrasives are better. They claim better cleaning and longer life.

Alloy Metal Abrasive Co., Ann Arbor, Mich., a producer since 1936, made chilled iron and malleable iron shot and grit until 1947, then changed over to steel abrasives.

Pangborn Corp., Hagerstown, Md., and Wheelabrator prefer hard steel shot because it isn't deformed on impact and gives greater coverage by rebounding longer. Harder impact causes greater surface deformation on the parts being processed. That is said to make for better cleaning and peening. Pangborn heat treats abrasives continuously; Wheelabrator processes its product in batches.

Wheelabrator feels that steel abrasives heat treated to uniform hardness offer the longest fatigue life. They reduce abrasive consumption and machine maintenance costs because fewer sharp particles are present in the operating mix. But harder shot and harder impact, with more rebounding, require more attention to machine maintenance, to prevent abrasive leakage. Shot and grit produced by the company has an average hardness of 45 to 51 Rc.

• Special materials or shapes are often required.

Cut wire is often used for special peening jobs, where abrasive loss is minimized. It costs more than other materials, but it is softer and more uniform. Cleveland Metal Abrasive Co. and Steelblast Abrasives Co., Cleveland, sell cut wire, in addition to other types.

Copper shot is sometimes used to clean brass, bronze, or copper castings. Indiana Copper Corp., Marion, Ind., has marketed the material since 1948.

• Experts agree that size and breakdown characteristics are important factors in selection.

Abrasive pellets don't wear out; they break down into smaller particles. In modern blast cleaning equipment, particles are thrown from rapidly rotating bladed wheels, or from an air blast nozzle. They strike the surface to be cleaned at high velocity. Particles are highly stressed at each impact and sustain a certain amount of fatigue damage. After several impact-and-recirculation cycles, excessive fatigue causes the pellets to break up into smaller ones. Irregular shapes are "balled up" into smaller spheres, which also pass through the fatigue and disintegration cycle. When the pellets break into particles too small to use, they are removed from the machine and discarded.

Best cleaning results are obtained when the operating mix contains a blend of large and small particles. Particles shouldn't be discarded while they are still usable.

• Growing popularity of metal abrasives has prompted expansion.

The metal abrasive industry has come to life since World War II, says R. J. Stewart, president, Cleveland Metal Abrasive Co. His company is making a $350,000 addition to its plant.

Wheelabrator boosted its production in 1958 and doesn't plan further expansion in the near future. Metal Blast Inc., Cleveland, increased production 30 per cent since 1955 and has no immediate plans for expansion. Pangborn plans further expansion soon.

National Metal Abrasive Co. recently completed a 30 per cent expansion at Western Metal Abrasives Co., its affiliate in Chicago Heights, Ill. Additions are also being made at the Pittsburgh plant of Pittsburgh Crushed Steel; the company's subsidiary, Globe Steel Abrasive Co., has been modernized since 1957.

Large Shapes Open New Nylon Market

Sections weighing up to 400 lb in production, but quantities are limited at present

MASSIVE nylon sections (they weigh 400 lb and measure 36 x 2⅝ x 102 in.) are being produced by Polymer Corp., Reading, Pa.

The large shapes are expected to open up or expand the use of nylon in the metalworking and manufacturing fields. Some possible applications: Tooling fixtures, wear plates, large rollers.

Louis Stott, Polymer's president, cites the paper processing and textile manufacturing fields as two industries where large cylindrical nylon rolls have potential application because of nylon's inherent corrosive resistance, resilience, and mechanical surface characteristics.

Polymer, a producer of industrial plastics in finished and semifinished shapes, is offering the new shapes in limited quantities and will soon make them available on a production basis.

Studies are being made to determine if manufacture of even larger sizes can be justified.

Newly developed nylon shapes measure 36 x 2⅝ x 102 in.

in this zone, stainless steels that remain ductile with high strength and stability

In the search for favorable strength-to-weight ratio, high temperature alloys have been developed with extreme strength up to 1000 F, but at the expense of ductility.

In AM 350 and AM 355, Allegheny Ludlum's precipitation hardening stainless steels, you have high hardness and stability from room temperature to 1000 F, plus almost twice the ductility!

These advantages are followed by easy formability using normal techniques. AM 350 and AM 355 can be brazed and welded as easily as the common stainless steels. They can be spun, formed and machined without special preparation.

AM 350 is available commercially in sheet, strip, foil, small bars and wire. AM 355, best suited for heavier sections, is available commercially in forgings, forging billets, plates, bars, wire, sheet and strip.

For further information, see your A-L sales engineer or write for the new technical booklet, "AM 350 and AM 355." **Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Penna.**

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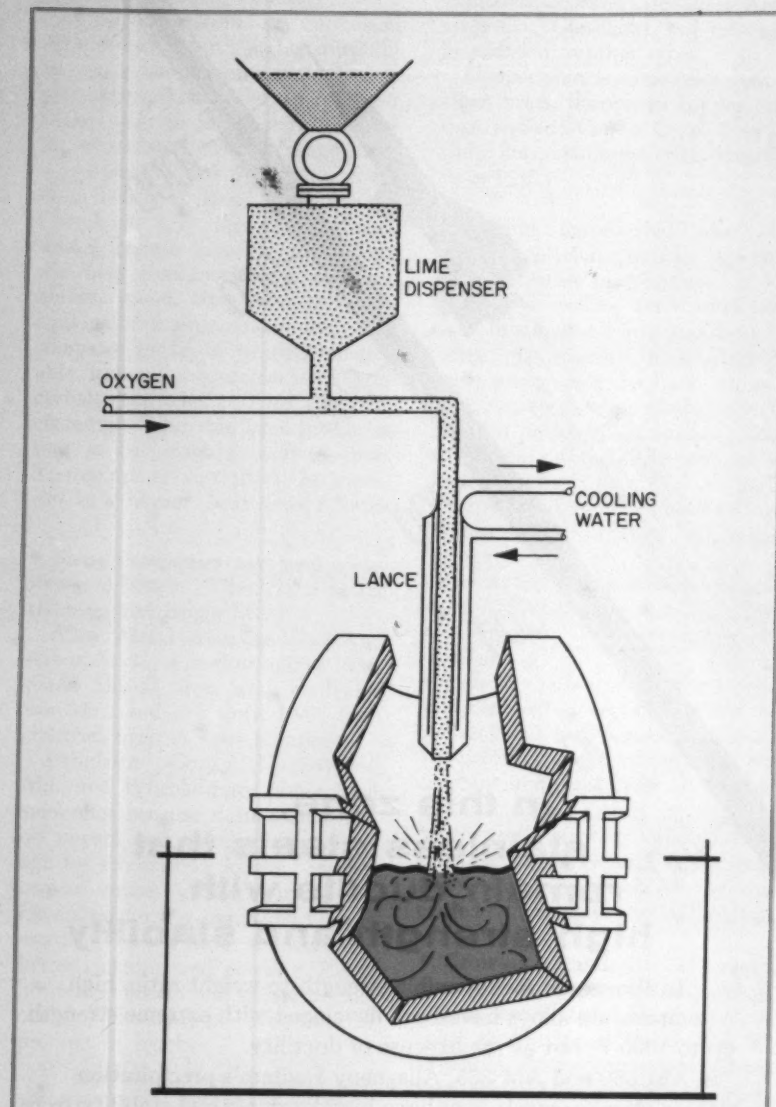


Pure oxygen blows dispersed lime powder into the hot metal bath

French Converter Process Produces Quality Steel

A PNEUMATIC process that converts hot metal to steel with powdered lime dispersed in a stream of pure oxygen promises a high grade product, at reasonable cost, using several types of molten iron.

The process was developed, after several years of study, by IRSID, the research institute of the French steel industry. One of the converters is being operated commercially by Societe Usinor at Denain, France.

• Powder injection produces rapid, intimate contact between components in the converter charge.

The process converts pig iron in a stationary vessel. Powdered lime is blown on the surface of the melt by a jet of pure oxygen.

The vessel is a modified basic bessemer converter—the bottom, with tuyeres, was replaced with a solid one. Lined with a tarred dolomite material, the vessel is 8½ ft in diameter at bath level. It makes steel in 20 to 30 ton heats.

A copper tipped lance, cooled with almost 8000 gallons of water per hour, is poised vertically over the bath. It can be adjusted laterally or vertically, for removal from the converter or adjustment of the distance between the nozzle and the bath.

A lime dispenser accurately and uniformly injects a given amount of powdered lime into the oxygen stream. Concentration depends on pig iron composition, refining phase, and the desired steel analysis.

• The process requires scrap or iron ore for cooling, in addition to hot metal, lime powder, and oxygen.

Iron comes to the converter from ladles or from a mixer. The lime used is a commercial grade; its composition, appearance, and degree of calcination may vary because it is pulverized before use.

The lime may be ground at the steel plant by rotary crushers, with 2 mm screens, or it may be ground at the kiln and delivered to the converter as a screened product, in airtight containers.

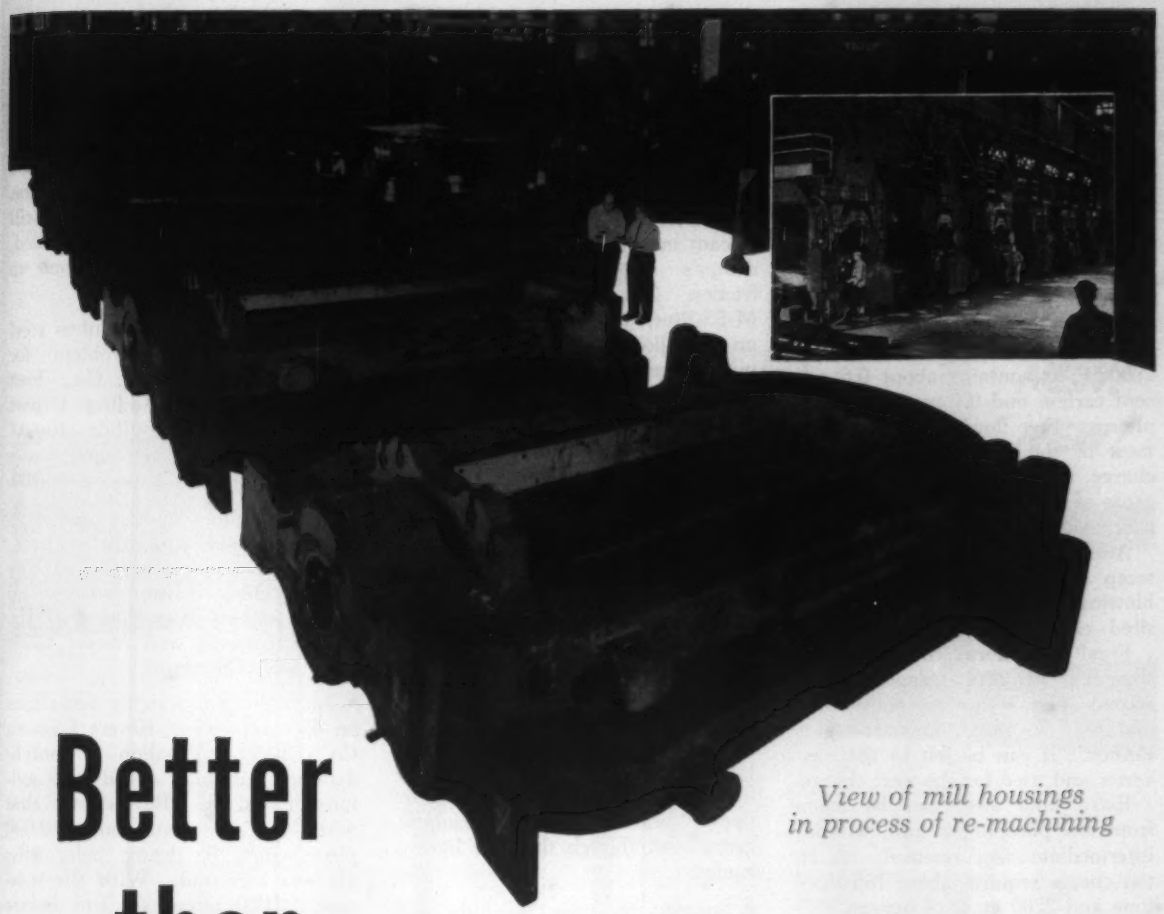
Oxygen used at the Denain plant is 99.5 per cent pure; it is available at 210 psi and metered into the vessel at 85 psi. Oxygen flow into the converter is limited to 3½ cu ft a minute.

The process uses iron ores (Swedish or Canadian) and scrap as cooling additions.

Conversion time (tap to tap) is 1 hour for a 30 ton heat at Denain, but it may be cut to 45 minutes when the company's oxygen generating plant is enlarged.

• Process flexibility permits several types of iron to be used.

High phosphorus iron can be converted by blowing with lime powder and oxygen throughout the refining operation. Concentrated



View of mill housings in process of re-machining

Better than New!

This Five Stand Tandem Hot Finishing Mill has been in use for many years in the Pittsburgh Area. It is being completely modernized with the latest design features including automatic screwdown, improved anti-friction roll neck bearings, etc. Then the original mill, in better than new condition since equipped with these modern features, will be operated in the Chicago District for many future years of competitive service in the steel industry.

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Our plant is equipped with a superior complement of well diversified machine tools that are available on a continuing basis for economical machining of heavy castings or the manufacture of auxiliary rolling mill equipment, such as heavy mill tables, furnace pushers, slab depilers, downcoilers, ingot buggies, slab transfers, etc.

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lime reacts instantly with the hot metal.

Removal of high lime-low iron slag once or twice during the operation takes out much of the phosphorus and sulfur.

Before blowing, the converter receives cooling additions but no flux. Then the lance is lowered; about 1760 cu ft of oxygen and 240 lb of lime are injected per ton of iron. Some ore is also added for cooling.

When the slag is drawn off, the metal has a temperature of about 2900° F; it contains about 0.6 per cent carbon and 0.1 per cent phosphorus. Free flowing slag contains most of the phosphorus from the charge, and much of the sulfur, because of its basic character and low iron oxide content.

After slag removal, addition of scrap and ore cools the bath, and blowing is continued until the desired carbon content is obtained.

Final phosphorus content is less than 0.02 per cent. Slag from the second stage is low in phosphorus and high in iron, but quantity is limited. It can be left in the converter and used for the next charge.

Extra mild steel can be made from low phosphorus iron, without intermediate slag removal. A 30 ton charge requires about 185 lb of lime and 2200 cu ft of oxygen.

High silicon iron can be processed easily in the converter because lime neutralizes silica slag as it is formed through contact of oxygen and silicon in the bath. Immediate removal of acid material helps prolong the life of the basic converter lining.

• Steel produced is said to have good chemical and mechanical characteristics.

With the right casting methods, the process can produce extra mild steel containing 0.015 per cent phosphorus, from iron containing 1.8 per cent phosphorus. The high desulfurization rate allows reduction of sulfur content from 0.50 per cent to 0.015 per cent. Nitrogen content is uniformly low—0.001 to 0.002 per cent.

The Denain plant has produced over 10,000 tons of extra mild steel for sheets. Tests showed uniformly good mechanical properties. Studies indicate the process can be easily modified to make high quality semihard steel.

Lubricant Tailored for Tough Jobs

Extreme pressure, high friction applications are being handled by molybdenum disulfide

A MOLYBDENUM disulfide lubricant may help solve some of industry's tough, extreme pressure friction jobs. Called Molykote M-55-Plus, the lubricant depends on a colloidal dispersion of submicron particles to fight friction. Since it doesn't require the fusion of additives, the product can be used on slow moving parts where little or no heat is generated.

The manufacturer, Alpha-Molykote Corp., Stamford, Conn., says the product has been approved for use in mist type lubricators. It's also recommended as an additive in drawing oils, tapping compounds, gear oils, and petroleum base hydraulic fluids.

The improved lubricity of the product, and its ability to plate itself out on metal surfaces, says the company, recommends it also for wear reduction applications in sleeve bearings and instrument gears, even though they are lightly loaded.

• **Success Stories**—The lubricant supersedes the company's M-55, which has a long list of job successes behind it. Some are cited:

• When bronze sleeve bearings begin to run hot, incipient failure is indicated. At American Locomotive Co., Auburn, N. Y., addition of M-55 to the oil eliminated the need for further bearing attention.

• At Paymaster Corp., Chicago, production men had trouble holding size and location on boring (to tolerances of 0.0001 in.). The trouble was caused by temperature increases. Molybdenum disulfide in the cutting fluid eliminated about 80 per cent of the problems.

• Tools used to draw stainless steel sinks at the Bremerton Navy Yard, Bremerton, Wash., used to gall easily. Solution: Three bonded coats of molybdenum disulfide on the tools and a brush coat on the steel.

• Erdle Perforating Co., Rochester, N. Y., increased feeding speed and added 70 to 80 per cent to die life by adding Molykote to coolants and cutting oils. With hot rolled, 24 gage stock, die life was increased from about 30,000 lb of production to 51,000 lb, and the dies are still in good condition. With cold rolled, 16 gage stock, die life has gone up from 50,000 to 90,000 lb.

• Tapping laminated stainless steel presented a tough problem for T. & F. Engineering Co., East Cleveland, Ohio. Adding 1 part of molybdenum disulfide to 15 parts of pure lard oil sent pieces per tap from 10 or 15 to about 400.

• Molybdenum disulfide added to hydraulic fluids and leather packings has considerably reduced friction at rubber O-ring packings and leather packings, say Rockwell Mfg. Co., Pittsburgh, and Meyer Snow Plow Co., Cleveland.

• In progressive drawing operations on 430 stainless at Revere Camera Co., Chicago, 1 gallon of molybdenum disulfide is added to 9 gallons of lard oil. Revere says that with lard oil alone, only 10,000 pieces could be drawn before the die was reground. With the mixture, 20,000 pieces are run before die refinishing.

• Producing up to 60,000 pieces without cutting tool maintenance is claimed by American Coupling Corp., Ferndale, Mich. The company makes $\frac{3}{4}$-16 nuts from $\frac{7}{8}$ in. medium carbon steel bar stock. Operations are drilling, tapping, undercutting, facing, and cutoff. About 1 gallon of molybdenum disulfide is added to each 100 gallons of cutting oil.

• Another manufacturer had difficulty knurling a cylindrical part of a center armature $1\frac{1}{2}$ in. in diameter and 4 in. long. The spindles were made of nickel chrome steel (39 Rockwell C hardness). Knurling wheels and pins were breaking regularly. Molybdenum disulfide brushed on the diameter to be knurled solved the problem.

• A research association reports that satisfactory tapping of titanium alloy Ti 150-A at high speeds has been done with taps specially treated with the lubricant.

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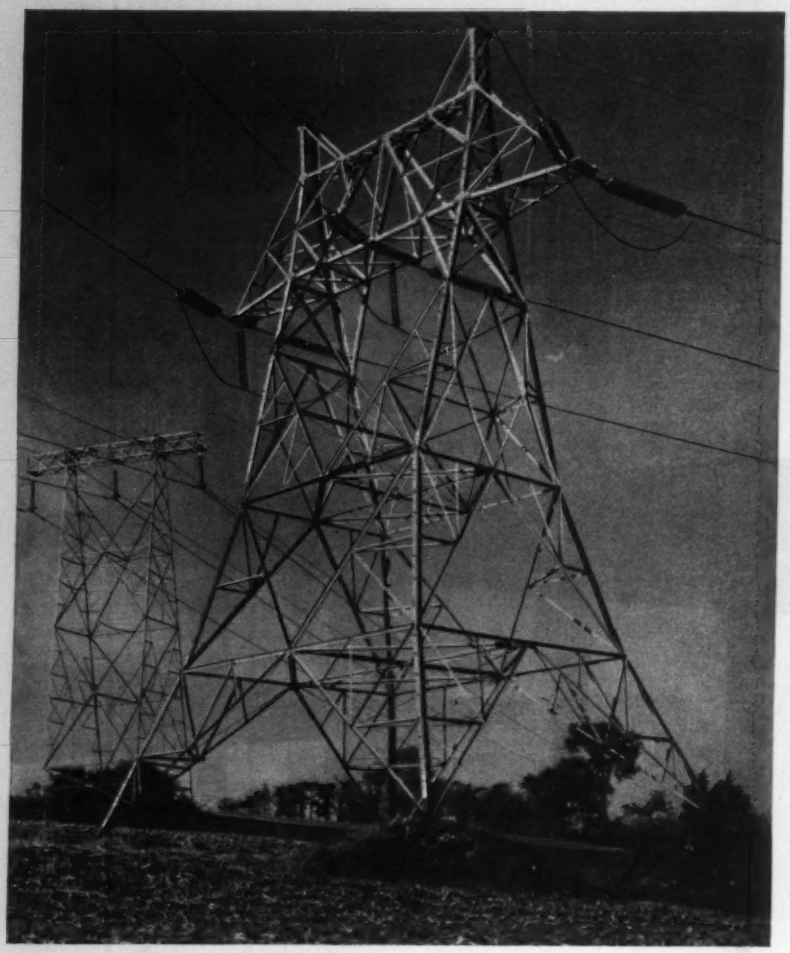


Zinc Bodyguard on Steel Helps Fight vs. Corrosion

Galvanizing adds a protective layer which resists corrosion itself and protects the base metal even when it is removed in some areas. The thickness of the coating can be varied to meet service conditions

GALVANIZED steel continues to account for a major portion of the zinc consumed (more than 40 per cent) in the U. S.

It is applied continuously and on individual articles in many different thicknesses. Hot dip galvanizing, required for the most severe conditions, produces the heaviest coatings.

• **Variable Depth**—The oldest method of application is hot dipping. The steel is cleaned by pickling, coated with a flux, and dipped into the bath of molten zinc. Result: A coating of the protective metal, attached to the steel by means of an alloy layer containing both steel and zinc. The thickness of the intermediate alloy layer can be controlled by additions to the zinc, although only small amounts of other elements are required. The characteristic spangle appearance can also be controlled by alloying agents, such as tin or antimony.

In modern practice, the galvanizer uses metal bath temperature as another means of controlling coating properties.

Small parts, threaded work, and pieces handled in baskets may be centrifuged after dipping to remove excess zinc. While the added zinc would enhance service life, it might fill small holes and threads.

The thickness of the intermediate alloy layer may be reduced by aluminum additions; the layer is somewhat brittle, and parts to be formed after galvanizing need the flexibility contributed by the thinner layer.

• **Sacrificial Role**—The basic principle of the protection offered by zinc is not difficult to understand. The details of corrosion mechanisms are frequently complex, and galvanized steel is no exception.

Relative corrosion rates of metals are compared by means of the electromotive series, a listing of metals in the order of their chemical activity. When two metals in the series are connected by a wire, or attached to each other, and placed in a corrosive environment, the more active of the pair will be attacked, while the other will remain unaffected. Zinc is more active than iron, so it is the one of the pair which will dissolve.

When zinc is coated on steel, the zinc itself offers some protection. And, more important, if a break in the surface of the coating allows the supporting steel to be exposed, the zinc adjacent to the break will protect the base material. So there is little loss of strength. There is also a tendency for corrosion products of the zinc to deposit in the exposed area, giving some mechanical protection to further attack.

• **Outdoor Exposure**—An everyday

use of galvanized steel is in the hardware of supporting structures for electrical transmission lines. Pennsylvania Power & Light Co., serving 10,000 square miles in central and eastern Pennsylvania, uses galvanized steel on such components as its 7500 steel transmission towers and substation structures. The towers are 80 to 250 ft high, weigh up to 110 tons, and are exposed to industrial fumes as well as wind, rain, and ice.

Specifications call for a "2 ounce" coating, containing an ounce of zinc for each square foot of surface; a sheet 1 ft square would carry 2 ounces, one on each side. In addition to a regular yearly visual inspection, each tower is given a climbing inspection every six years to check for loose hardware and to examine the condition of the steel in the structure. Any surface damage is repaired by painting with a zinc dust paint to further prevent corrosion. Average length of service for the towers is slightly over 20 years.

Lehigh Structural Steel Co., Allentown, Pa., supplier of the tower components, has been producing such equipment for Pennsylvania Power & Light for 37 years. The size of many sections requires large tanks for holding the molten zinc alloy; one is 33 ft long. Such units as steel angles and tower lacings, weighing 30 to 100 lb, and tower legs which can weigh as much as 2 tons, are handled individually. All steel is pickled and washed prior to the coating step to insure smoothness and completeness of the zinc layer. After removal from the galvanizing pot, the parts are chilled in water to set the coating.

Each part of the tower is marked and coded to conform with the utility's markings. Sections are check fitted before shipment, and in some cases, an entire tower will be assembled before shipment to assure that it will go up with a minimum of difficulty on site.

Towers are major components in delivering power to the user. Galvanizing helps assure that service interruptions will be few.

• If this article is useful to you, see the Servicenter.

Study Decides Choice of Steel for Truck Bodies

High strength material selected as result of consultation with owners, maintenance men, and drivers. Reduction in weight results in more economic vehicle operation

CUSTOMER reaction is weighed in choosing materials used in fabricating truck bodies at Boyertown Auto Body Works, Boyertown, Pa.

High strength steel, a Boyertown study shows, is the best all around material to satisfy the owner, the driver, and the maintenance man.

• Truck owners want weight cut so they can minimize operating costs.

By using high strength steel, Boyertown saves 600 to 650 lb over ordinary mild steel in a 12 ft forward control delivery body.

For exterior and interior panels, posts, ribs, cross members, floors and windshield assembly, Boyertown uses 22, 18, 14, and 12 gage high strength steel. For those purposes, Jalten No. 2 (made by Jones & Laughlin Steel Corp.) is specified.

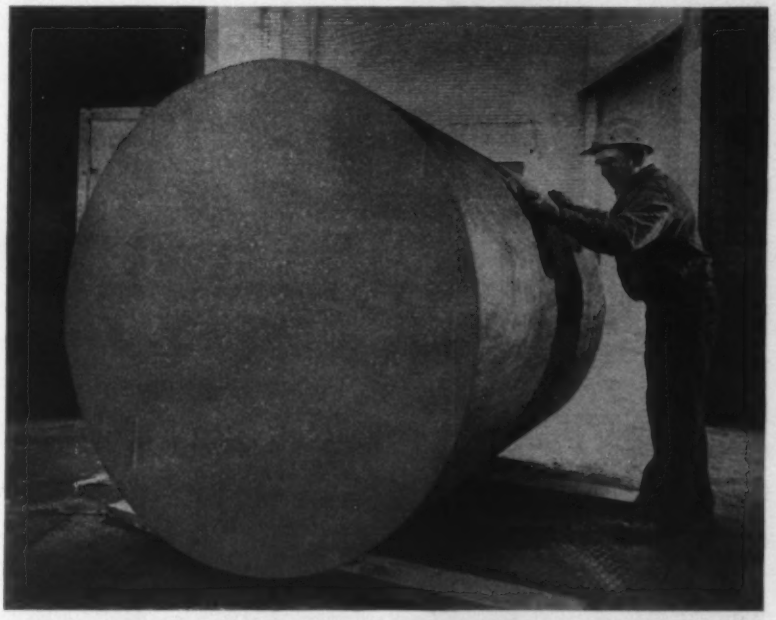
• Maintenance men are interested in reducing dents and wear.

High strength steel does that by resisting abrasion and impact.

Standard mill size sheets make possible speedy replacement and inexpensive repairs. The panels are attached by riveting so they are easily removed and replaced.

• Drivers express concern about convenience and safety.

The ductility of high strength steel makes it possible to design truck bodies with convenience calculated to encourage driver efficiency.



THIS GRAPHITE CYLINDER, said to be the largest ever made, is 61 in. in diameter, 72 in. long, and weighs 7 tons. It's one of five such giants made for a leading chemical firm by National Carbon Co., a division of Union Carbide Corp., New York. Application: The cylinder will be cored to make sections for a large graphite tower in which elemental phosphorus will be burned for the production of phosphoric acid

Numerical Control Gets New Job

Tube bending is done by the numbers on a new machine tool. First application will be on automotive tail pipes, but look for it to be used on a wider variety of jobs

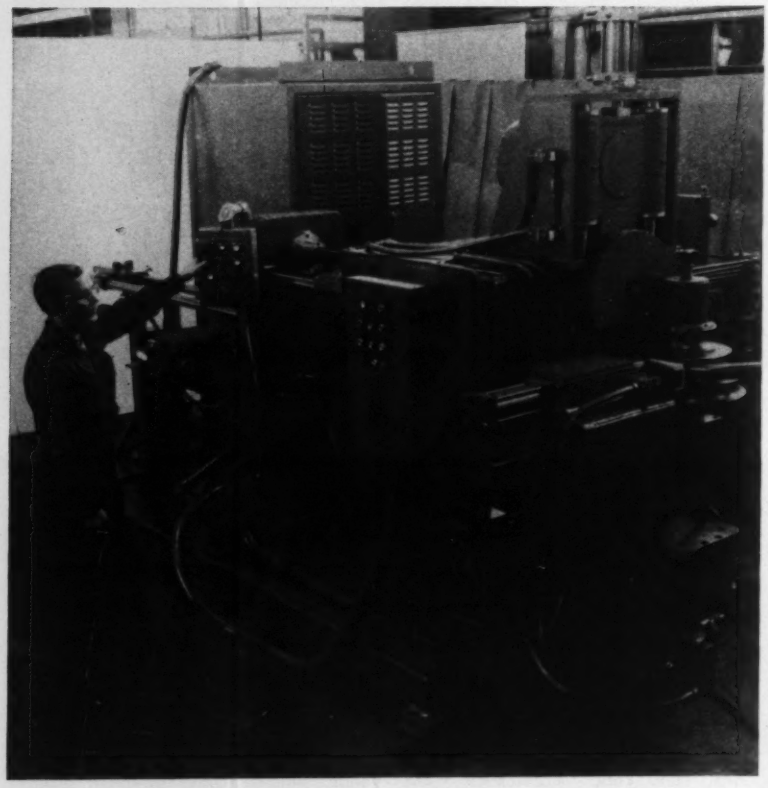
A TAPE controlled machine solves the complex problem of custom bending straight tubing into tail pipes which fit almost any auto or truck.

Called the Bend-O-Matic, it may soon pay off in a host of metalworking's pipe and tube bending jobs.

• **Advantages** — Chief benefits include a drastic reduction in inventory (large distributors of auto parts may have to stock 750 tail pipe models), a reduction in floor space for storage, elimination of the obsolescence problem (old or rare styles can be bent on order and need not be stocked), and reduced material costs since standard lengths of straight tube, instead of a variety of bent pipes, are bought.

It is estimated that any distributor with an annual volume of 50,000 tail pipes can realize a net saving of $55,000 a year.

• **Its History**—The machine is a joint development of three companies: Nu-Era Corp., Detroit, had the idea for the machine and will market it. Hamilton Div., Baldwin-Lima-Hamilton Corp., Hamilton, Ohio, designed and built it. General Electric Co.'s Specialty Control Dept., Waynesboro, Va., tailored the electronic control that automates the machine.



Tape, in reader just below operator's arm, controls bending of pipe. At right, pipe emerges between a die and shoe—is wiped to proper curvature

Only loading and unloading are not automatic. The operator picks the tape for a style of tail pipe and puts it in the reader. He loads the right size tube into the machine (through a chuck that both rotates and feeds the pipe) against a stop that corresponds to the control system's zero point. After he pushes the cycle start button, his next job is to unload a finished pipe.

The tape controls the length of feed (distance between bends), the tube rotation (so bends can be made in any plane), and the bend angle. The tube feeds between a die segment and a shoe that wipes the tubing around a controlled portion of the die circumference.

The tubing is bent to specifications without a mandrel and without being packed. Walls do not collapse in a severe bend because programing is in relatively short, easy stages.

• **Market**—Nu-Era Corp. officials plan to lease the machine for $25,000 a year, which includes tooling, tapes, and machine service. As part of the package, GE has assumed the service responsibility for the control.

B-L-H spokesmen say they intend to adapt the principles of the machine for use on nearly all types and sizes of metal pipe and tubing conventionally used by industry.

Plastic Valves Resist 93.19% Sulfuric Acid

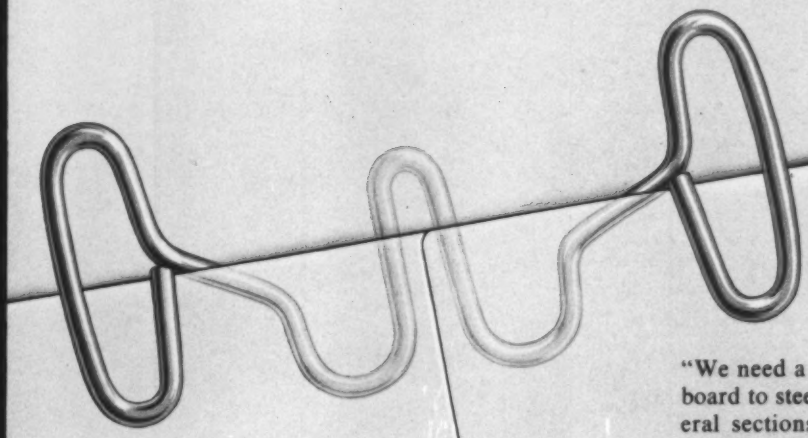
Plastic valves that handle 93.19 per cent pure sulfuric acid at Upjohn Co., Kalamazoo, Mich., have been in service for more than three years without a sign of corrosion, reports the supplier, Tube Turns Plastics Inc., Louisville.

The material used (UPVC—unplasticized polyvinyl chloride) is expected to last "indefinitely." Comparison: Tube Turns says metal valves, including cast iron and 304 stainless, had a life of five months.

The plant uses sulfuric acid to wash (regenerate) a mineral bed for deionized water used in the production of pharmaceuticals.

KEYSTONE WIRE... DUDEK & BOCK

turn an idea into a reality



"We need a clip that will securely fasten gypsum board to steel upright studs—or join and hold several sections of board in perfect alignment for plastering. Here's what it must look like."

This is the challenge. Designers at Dudek & Bock, Chicago, Illinois, roll up their shirt sleeves. They analyze wire requirements: tensile, uniformity. Length of run—a long one. Delivery—soon.

What wire fits these requirements? Keystone Silver Brite Galvanized high tensile wire is first choice. They know from experience they can depend on Keystone wire to perform exactly as calculated—order after order—run after run. By standardizing on Keystone wire for the majority of their needs, Dudek & Bock simplify quality control and manufacturing problems. They regularly use a wide selection of Keystone wire to meet their forming and spring requirements—this includes low and high carbon wire, brite and galvanized.

Result: Another fastener problem solved with wire . . . delivery on schedule of this gypsum board clip and thousands of other items . . . and maximum customer satisfaction.

Perhaps creative imagination and Keystone wire can help you build your products faster, better, at lower cost. A Keystone cold heading or wire forming specialist is available to help you.

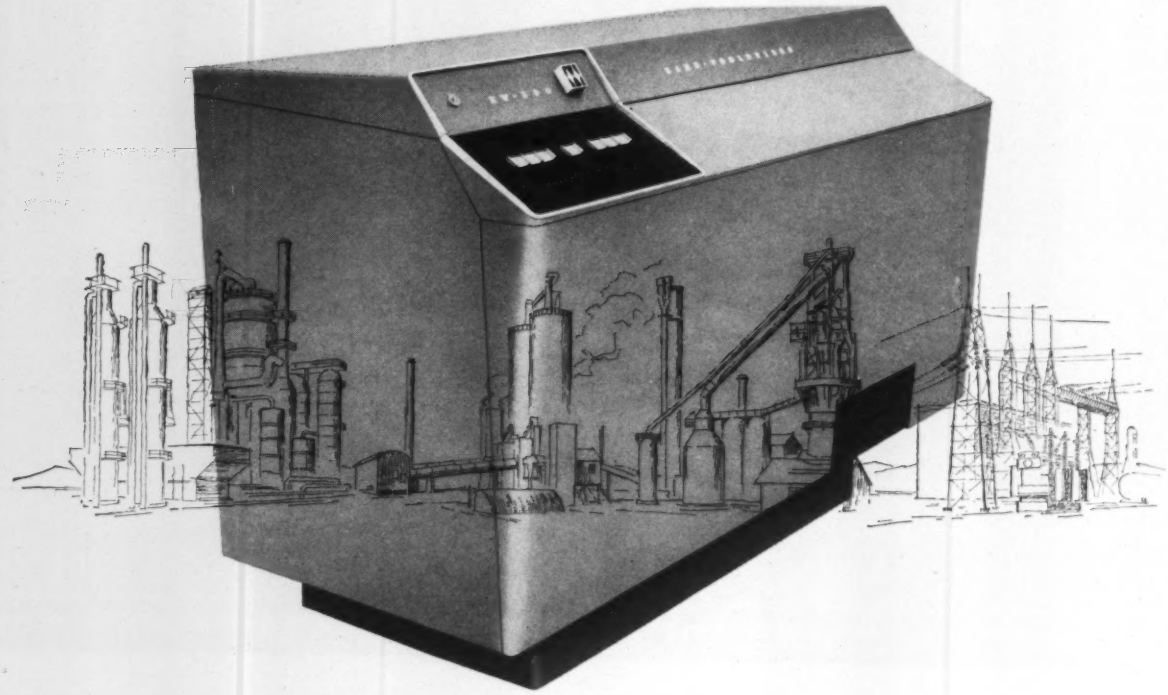
Keystone Steel & Wire Company, Peoria, Illinois

KEYSTONE

WIRE FOR INDUSTRY

In a Class by Itself

FOR CLOSED-LOOP CONTROL AND AUTOMATIC DATA REDUCTION



The RW-300

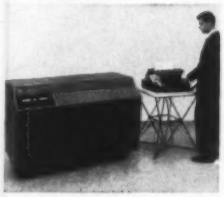
DIGITAL CONTROL COMPUTER

OPERATING SYSTEMS incorporating the RW-300 for on-line control and data reduction are demonstrating these tangible benefits: *reduced costs, increased output, improved quality.*

HIGH RELIABILITY, inherent in the advanced design of the RW-300, is being proven by thousands of hours of dependable operation.

SYSTEMS ENGINEERING staff, experienced in the analysis of complex control and data reduction problems, is assisting industry with applications of the RW-300 in chemical, petroleum, steel, cement, electric power, and other fields.

NATION-WIDE SERVICE organization is providing skilled maintenance for this completely developed, production engineered, and thoroughly tested piece of *industrial* equipment.



For further information, call or write Mr. Raymond E. Jacobson, Director of Marketing, The Thompson-Ramo-Wooldridge Products Company, 202 N. Canon Dr., Beverly Hills, Calif., BRadshaw 2-8892.

THE THOMPSON-RAMO-WOOLDRIDGE PRODUCTS COMPANY

a division of ***Thompson Ramo Wooldridge Inc.***

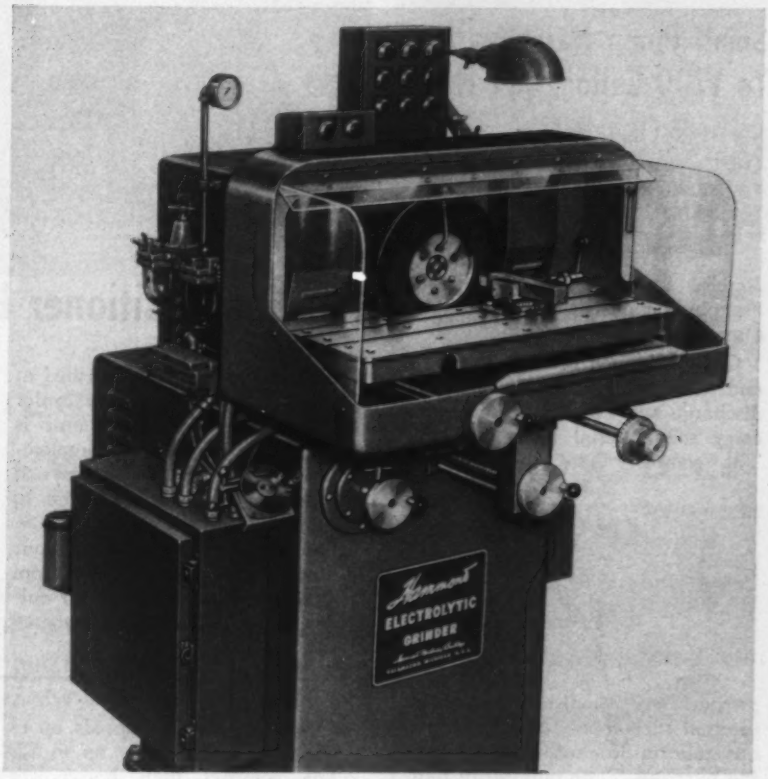
Electrolytic Grinder Has 12 x 29 in. Table

THE MODEL EG-10 oscillating grinder has a bigger wheel and table than previous models. Table size is 12 x 29 in. including wings. It can be tilted by handwheel from 10 degrees above to 22 degrees below horizontal with no movement toward the wheel. The table has replaceable wear plates and two standard $\frac{5}{8}$ in. tee slots. The wings support offset tools and push out of the way should the wheel stroke be increased.

The spindle carries a 10 in. diameter wheel. The nose is tapered for true wheel flange mounting. The spindle oscillates on tapered roller bearings and has a variable stroke length up to $1\frac{1}{2}$ in. The stroke frequency goes up to 100 per minute. The spindle assembly is insulated from the machine and has a 600 ampere capacity power pickup. Spindle speed is 2150 rpm.

Fog is removed by a built-in Hammond MistKolector and the electrolyte is continuously filtered.

For further information, *write* Hammond Machinery Builders Inc., 1600 Douglas Ave., Kalamazoo, Mich.

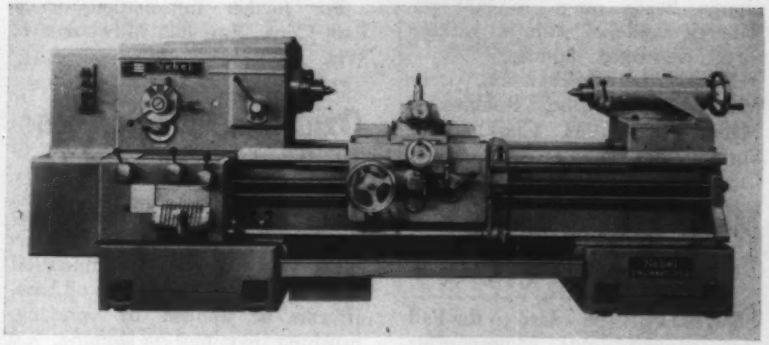


Lathe Has 18 Gear Driven Speeds, 20 hp, 60 Feeds

THE THIRD model in a new line of lathes can do a wide variety of heavy duty, precision machining. It's made to complete ASA standards and accuracy tolerances for engine lathes.

A three bearing spindle is used. It's mounted at the front and center supports on zero precision, angular tapered, roller type bearings. They're preloaded and adjusted for maximum radial and thrust loads. At the rear, the third bearing (radial type) provides for longitudinal spindle expansion.

A direct reading color index simplifies selection of 18 gear driven speeds. Up to 20 hp is supplied by a constant speed main drive motor through a multiple disc clutch and brake. The quick change box has 60 feeds from 0.0027 to 0.192, and 60 thread changes from 1 to 72



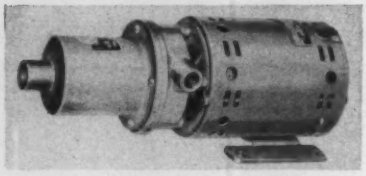
threads per in. (including standard pipe threads).

For further information, *write* Nebel Machine Tool Corp., 3405 Central Parkway, Cincinnati 25, Ohio.

Small Pump Has Flow Up To 1200 Gallons per Hour

NO PISTONS, valves, or high speed impellers are used in the Moyno line of small pumps. The only moving part is a stainless steel helical screw rotor that turns within a fixed rubber stator having a double internal helical thread. Pumping action is similar to that of a screw conveyor.

Cavities formed between the rotor and the stator move toward the discharge end of the pump and carry the material being handled. The company says the principle



provides positive displacement, low internal turbulence, and a continuous uniform flow suitable for metering purposes. The pumps can handle materials ranging from watery liquids to heavy, abrasive slurries, and substances containing relatively large particles in suspension.

Deliveries range from metering flow to 1200 gallons per hour. Discharge heads range to 300 psi. They're available with or without direct connected motors.

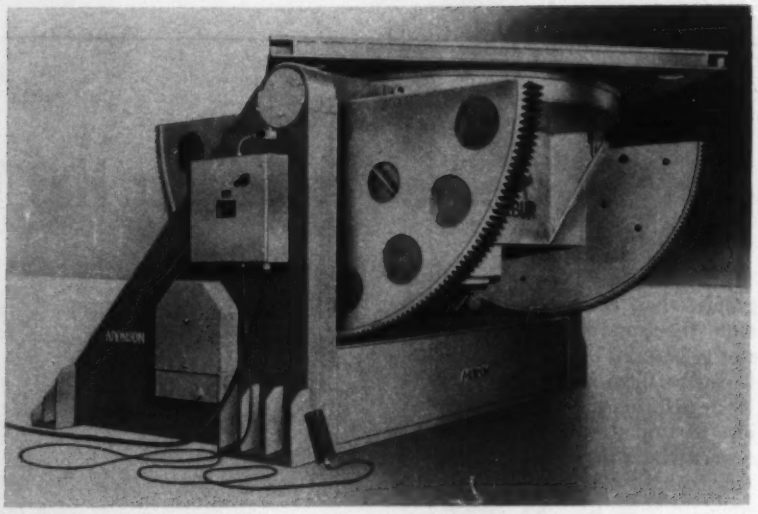
For further information, *write* Moyno Pump Div., Robbins & Myers Inc., 1934 Clark Blvd., Springfield, Ohio.

Motor Reducer Model Added to Low Speed Line

SIZE 8E has been added to the Falk line of All-Motor Motoreducers. The addition increases the range of applications for the line (especially in the lower speed ranges). Standard units have output speeds up to 1 rpm and horsepowers up to 75.

The compact high horsepower drive has an all steel housing, large overhung load capacity, positive lubrication, and 98½ per cent efficiency per gear mesh. Falk extra depth, high pressure, angle gear teeth are used.

For further information, *write* Falk Corp., Box 492, Milwaukee 1, Wis.



Welding Positioner Has 4 Speed Ranges

THIS welding positioner is rated at 175 tons capacity at 12 in. center of gravity location. The unit is tested before it is shipped completely assembled. The maker says it can be moved easily from site to site on rails.

A gearshift transmission has four selective variable speed ranges from 0.08 to 0.40 rpm. A 14 in. ID hollow spindle mounted on tapered roller bearings allows for fixturing and the passage of cables or gases.

A steel fabricated sandwich design table has eight radial and periphery slots for bolting or clamping the workpiece. Table flat height is 102½ in. When the table is tilted, the center line horizontally is 88 in.

For further information, *write* Aronson Machine Co., Arcade, N. Y.

Oxidation Inhibitor Can Be Brushed, Sprayed On

AN OXIDATION and rust preventive and inhibitor for metals called Poly-Rustex is a combination of chemicals dispersed in an oil base. It can be applied by spraying, brushing, mopping, or dipping.

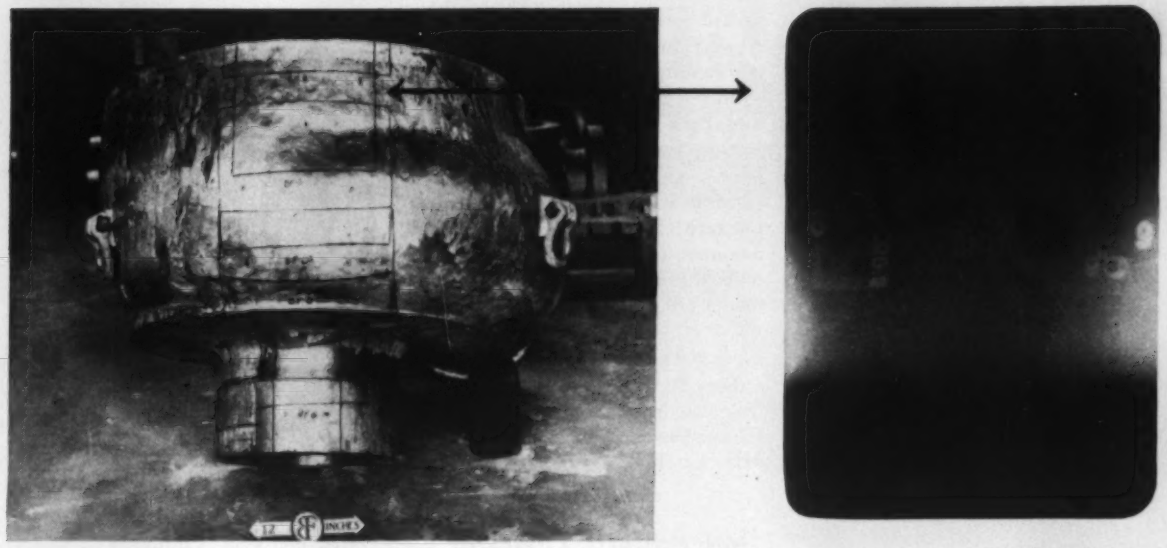
The product is low in viscosity and will not settle. It will not freeze and can be used in any weather. Poly-Rustex can be used on new metal or fabricated parts ready for shipment. Steam or standard solvents are used to remove it.

For further information, *write* Brad Chemical Inc., 111 W. Washington St., Chicago, Ill.

Solenoid Valve Handles Air or Fluids to 300 psi

THE Verso four way solenoid valve is designed for pneumatic or hydraulic fluid power use in the 40 to 300 psi range. It has a 3/16 in. diameter flow area. The Series "A" valves are available in over 100 variations in both side ported and manifold models, and with single or double solenoid actuation.

Options available include hydraulic adapters, integral junction boxes, manual override, threaded exhaust blocks, and a variety of manifold plates. The single solenoid



Marks on the casting show positions of the films during exposure. Above, radiograph of the area indicated.

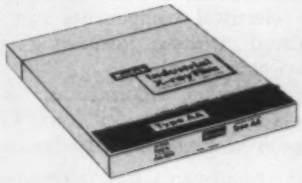
5 tons of stainless casting... Radiography goes over it inch by inch

Pumping radioactive water calls for pump castings that are flawless. Bonney-Floyd Company, one of the largest producers of steel castings for nuclear power use, makes sure of quality through radiography with Kodak Industrial X-ray Film.

Made of CF8(18-8) stainless steel, this casting will become the casing for the primary coolant pump for a large land-based nuclear power plant. Since this pump will handle radioactive water, utmost quality is required. To be sure of this quality, the Bonney-Floyd Company radiographed the entire casting, using their 24-Mev Betatron and Kodak Industrial X-ray Film, Type AA.

This is another example of how radiography provides assurance that only high-quality work is delivered to the customer. It is a way reputations for fine work are built.

You should take advantage of radiography. If you would like to know how it can work profitably for you, talk it over with an X-ray dealer or write us for a Kodak Technical Representative to call.



Read what Kodak Industrial X-ray Film, Type AA, does for you:

- Speeds up radiographic examinations.
- Has high film contrast, giving increased detail visibility and easy readability at all energy ranges.
- Provides excellent uniformity.
- Reduces the possibility of pressure desensitization under shop conditions.

EASTMAN KODAK COMPANY
X-ray Division **Rochester 4, N.Y.**

Kodak

model is 5¼ in. high and 1⅝ in. in diameter. The double solenoid measures 8 in. high and 1⅝ in. in diameter. Average weight: Less than 2 lb. Parts are interchangeable and the electrical components can be replaced without disturbing the valve or connections.

For further information, *write* Versa Products Co. Inc., 150 Coolidge Ave., Englewood, N. J.

Compressors Weigh 18 lb, Motor Rated at ⅛ hp

LUBRICATION is not required for a Winslow line of portable, oilfree, piston compressors. The piston has a specially compounded Teflon cup backed up by a silicone O-ring. The cylinder liner is made of Type 304 stainless steel. Aluminum alloy ball seating against silicone is used in the check valve.

The compressors are self-contained, and have automatic safety bleedoff valves available to release pressure in excess of preselected amounts up to 100 psig. Weight with the motor is 18 lb. Measurements are 10 x 9½ x 5¾ in. The motor is a ⅛ hp induction type (115 volts ac, 3 amperes).

For further information, *write* Winslow Mfg. Corp., a subsidiary of Conax Corp., 3695 E. Tenth Court, Hialeah, Fla.

Unit Protects Operator, Equipment from Current

THE MODEL A Contactor controls high amperage secondary currents for safety of personnel and equipment such as welders and the Arcair torch. It measures 20 in. high, 10 in. deep, and 8½ in. wide. Weight is a little over 40 lb.

The unit is equipped with extremely heavy silver alloy contacts. Rating is 600 amperes.

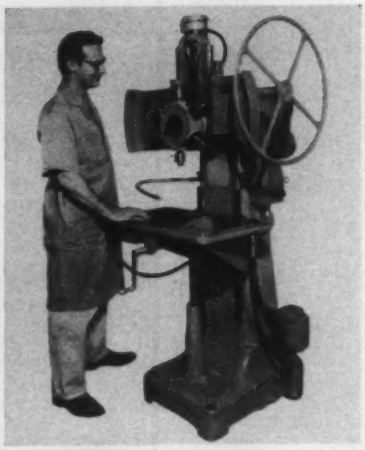
For further information, *write* Arcair Co., P. O. Box 431, Lancaster, Ohio.

Turret Drilling Unit Has Improved Accuracy, Finish

IMPROVEMENTS in the transmission and turret spindles of the Burgmaster IC turret drilling machine provide a smoother, stronger, troublefree drive with improved machine accuracy and finish, says the company.

The modified transmission uses an electric clutch for high speeds and an overrunning roller clutch for low speeds. Power from the drive motor is transmitted by two timing belts for high-low speed sprocket ratios.

Standard clutch elements automatically shift to supply preset speeds to six spindles in the turret ranging from 325 to 4050 rpm. Only the spindle in the work position turns and the turret power indexes at operator demand. Preselective skip indexing is optional.



For further information, *write* Burgmaster Corp., 15001 S. Figueroa, Gardena, Calif.

Refractory Stands Steady Heat up to 3000° F

YOU can use a refractory called Asbestosite to withstand continual exposure to temperatures in the 1000 to 3000° F range. It can also be subjected to much higher temperatures for short periods.

The company says tests on cylindrical specimen parts (½ in. wall) indicated a continuous OD temperature of 650° F while ID temperature readings were a continuous 2500° F. The material is easily fabricated in a wide variety of shapes and sizes. The manufacturer plans to make metal-clad configurations.

For further information, *write* Harco Laboratories Inc., 79 Olive St., New Haven, Conn.

Lightweight Hand Gun Sprays Titanium Carbide

THE HAND held Plasmatron spray gun weighs less than 4 lb and is 3½ in. long. It can operate on gases such as argon and nitrogen (at power levels to 40 kw). The manufacturer says it can be used to spray coat practically any material on steel, molybdenum, columbium, aluminum, magnesium, and many plastics.

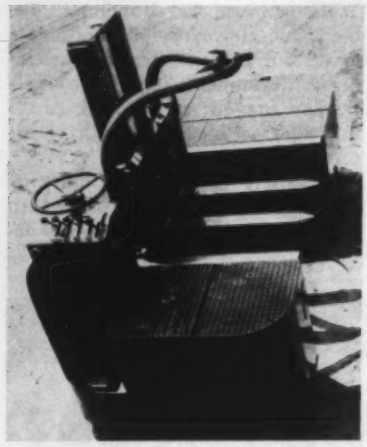
Materials such as titanium carbide, tungsten, chromium, or titanium can also be deposited on most ceramic base materials or met-

als without causing metallurgical, crystallographic, or chemical changes.

For further information, *write* Giannini Plasmadyne Corp., 3839 S. Main St., Santa Ana, Calif.

Side Loading Truck Holds Load from Twin Booms

THIS versatile, electric powered, sideloading Traveloader is made in 4000 and 6500 lb capacities. It's equipped with twin crane booms. The booms and forks have the same capacity, and are arranged so that a load suspended from them is automatically transported at the proper load center.



The booms are independent of the forks and can be easily removed. They can be joined at the tips or they can be separated to permit "two sling" usage for long load stability.

For further information, *write* Baker Industrial Trucks Div., Otis Elevator Co., 8000 Baker Ave., Cleveland 2, Ohio.

Radial Drill Press Can Do Rapid Multiple Drilling

YOU CAN drill to any point of a 32 in. square with the Delta radial drill press. It can handle rapid multiple, horizontal, and angular drilling.

The head swivels 360 degrees around the column and tilts more than 90 degrees to the right and left. The work remains parallel

Far Ahead in Design and Efficiency

"YOUNGSTOWN"

CONTOUR ROLL LATHES

Automatic

"templet or numerically controlled" hydraulic or electric tracers assure fine finish and precision operation

Designed for a single purpose—roll turning. Choice of turning rolls in housings on the roll necks or using the heavy duty live centers provided in the headstock and tailstock.

"YOUNGSTOWN" engineering anticipates your future, as well as present productive position, in this quality line of Contour Roll Lathes.

PROVEN PERFORMANCE FEATURES:

- Heavy Duty roll lathe *rigidity*—with the *versatility* of the engine lathe
- Use of carbide, or ceramic tools provided by wide RPM range of headstock speeds
- 3-way bed for rigidity, with hardened and replaceable wear plates
- Anti-Friction Ball screws and nuts for longitudinal travel of carriage and cross-slide insuring precision tracing
- Operator travels with the work
- Heavy-Duty spring-loaded tail stock with load indicator—safeguards bearings
- Headstock has illuminated inspection ports, automatic lubrication, Timken roller bearings
- Housings—manually or hydraulically operated
- Electric-Hydraulic Ragging attachment optional
- Heavy Duty mill type construction. Herringbone gearing throughout.
- Faceplate overhang eliminated.

Write us to arrange a demonstration.

The Youngstown Foundry & Machine Co.

Serving Industry Since 1885

Youngstown 1, Ohio

with the base. You have a choice of four speeds (700, 1250, 2400, and 4700 rpm).

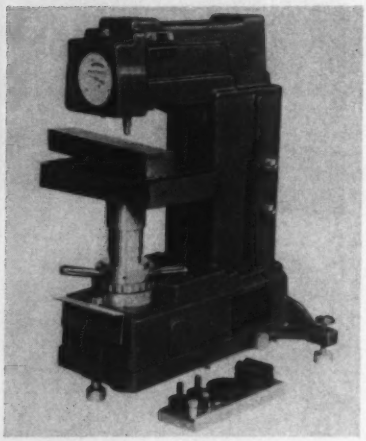
The table measures 23¾ x 15⅞ x ¾ in., is adjustable through 360 degrees. It's mounted to a fully machined 8½ x 9 in. cast iron table for precision drilling.

For further information, *write* Delta Power Tool Div., Rockwell Mfg. Co., 465 N. Lexington Ave., Pittsburgh 8, Pa.

Hardness Tester Can Reproduce Tests Better

MUCH of the chance for human error is eliminated by a hardness tester which automatically removes major testing loads. It can also give greater reproducibility of test results and reduce operator fatigue.

The Motorized Kentrall Tester, as it is called, is available as a combination unit which provides both regular and superficial Rockwell hardness testing in a single



machine. Where the additional range isn't necessary, the tester is available as a single purpose unit for regular or superficial testing.

For further information, *write* Torsion Balance Co., 35 Monhegan, Clifton, N. J.

Industrial Compressors Need Minimum Space

EASY installation and minimum space requirements without complicated engineering, special machinery rooms, or foundations are claimed for the Davey industrial compressors.

The units are enclosed and have no exposed belts or couplings. The manufacturer says they're quiet and vibrationless and have 50 per cent fewer working parts than other units of similar capacities. Only a small outlet is needed for the 180° F discharge air. You can choose from air or water cooled units.

For further information, *write* Davey Compressor Co., Myers Avenue, Kent, Ohio.

Conveyor Carries Loads to Different Table Heights

YOU can use the Buschman Table-Cable conveyor for handling a variety of products through assembly at worktable height. Four wheel carriers run on angle tracks, carrying light to medium weight loads on pallets or fixtures.

A variety of smooth functioning turns are available. The corner turn changes direction from 90 to 180 de-

EXECUTIVE REPORT #2

When Does a Blast Cleaning Machine Become Obsolete?

A good production tool, including a blast cleaning machine, becomes obsolete whenever a better tool becomes available to do its job at lower cost.

The management of Canton Malleable Iron Co. took this progressive viewpoint in evaluating their two old batch-type blast machines — both still working well, but having a hard time keeping up with increased cleaning demands.

They replaced both machines with one 14 cu. ft. Wheelabrator Super Tumblast. The savings made more than paid for the new equipment in less than two years. Savings of 16 man-hours daily in direct labor. Savings in reduced maintenance costs. Savings in record low abrasive consumption. And savings in production time, since the Super Tumblast handles all production cleaning many times faster than the two older machines together.

Wheelabrator takes the Guess-Work Out of heavy-duty blast cleaning

With approximately 200 Super Tumblasts in operation, only Wheelabrator has the necessary experience in solving these heavy-duty blast cleaning problems. Write for Bulletin 145-D giving documented performance results.

Wheelabrator Corp., 509 S. Byrkit St., Mishawaka, Ind.
Canadian Division: P.O. Box 490, Scarborough, Ont.

WHEELABRATOR
AIRLESS BLAST EQUIPMENT

grees. With inclines and hold-down angles (with the Bush-Lock cable design) loads can be carried to various table elevations.

For further information, *write* E. W. Buschman Co., Clifton & Spring Grove Avenues, Cincinnati 32, Ohio.

Wet Blast Unit Finishes Parts at Production Rates

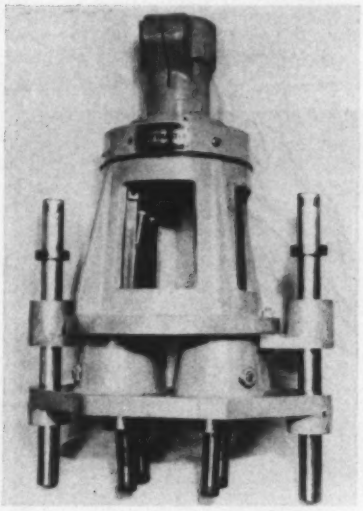
THE OPERATOR of a wet blast unit that does high production rate finishing of small parts can remain seated.

Work is loaded and unloaded at two bays at the operating station. Moving blast guns (driven by air cylinders) are positioned at each bay. The operator places parts in either or both bays and depresses a pedal, activating the blast guns. A preset timer determines blast time length and gun oscillation speed. Masks may be used. The unit is 46 in. high, 24 in. wide, and 34 in. deep.

For further information, *write* Pressure Blast Mfg. Co. Inc., 27 Pleasant St., Manchester, Conn.

Angular Drill Head Has Cartridge Type Spindles

MULTIPLE SPINDLE drilling or tapping of holes at an angle can be done with a Thriftmaster, adjustable, angular drill head. The unit has cartridge type spindle construction.



The four spindle drill head can tap four holes, each at a 4 degree angle with the vertical. Different cartridge plates will permit minor center distance or spindle angle changes.

For further information, *write* Thriftmaster Products Corp., 1044A N. Plum St., Lancaster, Pa.

Welder Has Stable Arc

THE Lincoln, 180 ampere arcwelder is designed for convenience and versatility. A dial type control is provided for easy setting of output over the amperage range. Electrodes from the smallest to 3/16 in. can be used to weld materials from 20 gage to ½ in. (or thicker) plates.

Arc characteristics are termed unusually stable. The unit can weld mild steel, low alloy steel, and Type 18-8 stainless steels. It operates on 220 volts (single phase), has a voltage input adjustment. Permanent cable connections are used.

For further information, *write* Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio.

EXECUTIVE REPORT #5

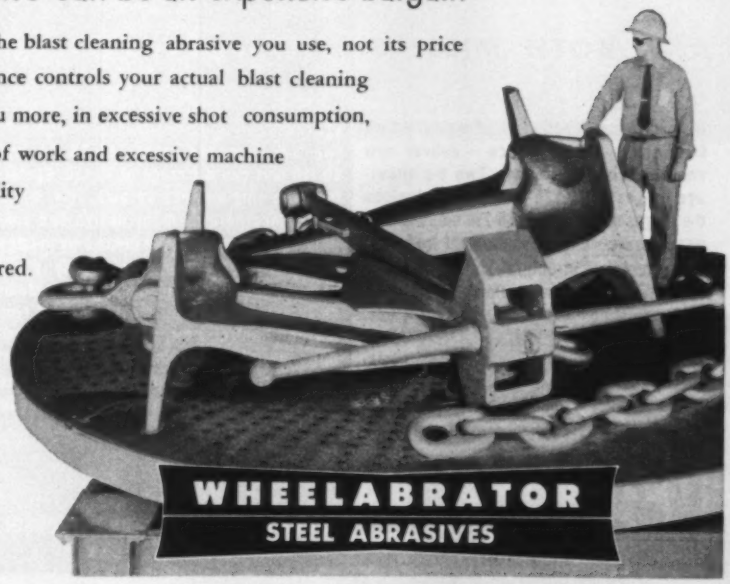
DON'T SAVE PENNIES TO LOSE DOLLARS

the lowest-priced abrasive can be an expensive bargain

Your real concern is the *ultimate cost* of the blast cleaning abrasive you use, not its price per ton. Abrasive quality and performance controls your actual blast cleaning costs. Lower priced abrasives can cost you more, in excessive shot consumption, lower production volume, poor quality of work and excessive machine maintenance. In case after case, high quality Wheelabrator Steel Shot has proven to be the *lowest-cost* abrasive, all factors considered.

You can prove the savings you'll make with Wheelabrator Steel Shot

Your Wheelabrator Abrasive Engineer will demonstrate the performance of Wheelabrator Steel Shot in your own plant. For details write to Wheelabrator Corp., 509 S. Byrkit St., Mishawaka, Ind. In Canada, P.O. Box 490, Scarborough, Ontario.



NEW literature

Write directly to the company for a copy

Two Aircraft Steels

Mechanical and physical properties of AM-350 and AM-355 steels are defined in a 24 page booklet. Working information covers heat treating, forming, forging, welding, brazing, and machining. Advertising Dept., Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.

Molybdenum Brochure

A 12 page brochure describes the applications, physical properties, and production processes of molybdenum. Chemical & Metallurgical Div., Sylvania Electric Products Inc., Towanda, Pa.

Corrosion Resistant Alloys

A bulletin outlines applications of Hastelloy Alloys B and C and describes their resistance to corrosive fluids. Alloy Tube Div., Carpenter Steel Co., Union, N. J.

Ways to Cut Costs

"Cost Reduction on Assembly and Production Lines," Bulletin No. 73, shows examples of Feedrail systems to insure unfailing operation of the electrical tools on production and assembly lines. Feedrail Corp., 125 Barclay St., New York 7, N. Y.

Handy Chart on Gases

A wall chart shows at a glance gaseous equivalents of 1 through 5000 gallons of liquid oxygen, nitrogen, and argon. Cryogenic Div., Ronan & Kunzl Inc., Marshall, Mich.

Data on Cryolite

"Cryolite—Properties and Industrial Applications," 24 pages, gives the history, physical and chemical properties, and uses of natural cryolite. Chemical Div., Pennsalt Chemicals Corp., 3 Penn Center, Philadelphia 2, Pa.

Molybdenum Metal Diagrams

"Molybdenum Metal Technical Notes," provides convenient, condensed data and selected references on binary and more complex diagrams pertaining to molybdenum. Climax Molybdenum Co., a division of American Metal Climax Inc., 500 Fifth Ave., New York 36, N. Y.

Furnace Brazing Techniques

A 16 page bulletin describes the advantages, design, materials, brazing medium, supporting fixtures, protective atmospheres, and temperatures of furnace brazing techniques. Electric Furnace Co., Salem, Ohio.

Aluminum for Architecture

Comprehensive information, covering the selection of aluminum alloys and surface finishes for a vast array of building industry applications, is contained in a 20 page booklet. Metals Div., Olin Mathieson Chemical Corp., 400 Park Ave., New York 22, N. Y.

Ambraze Silver Solder

A 4 page brochure lists compositions, melting points, and other data about the company's line of silver solder and other brazing alloys available. American Brazing Alloys Co., P. O. Box 11, Pelham, N. Y.

Mechanical Joining of Aluminum

A 32 page book answers questions about mechanical fastening methods for aluminum. It covers nails and pins, metal stitching, mechanically formed joints, and architectural fasteners. Dept. PRD-28, Reynolds Metals Co., Richmond 18, Va.

Timing Belt Drives

Catalog No. DTE-1 presents information on the selection, design, installation, operation, and maintenance of timing belt drives. Dept. P59, R. & J. Dick Co. Inc., Totowa, N. J.

Protective Coating for Steel

A bulletin gives pointers on selecting and applying neoprene for protective coatings on steel. A chart specifies chemical and solvent resistance of neoprene in a variety of atmospheres. Small Business Administration, Washington 25, D. C.

AND BOTH MILLERS... *Through and Through*

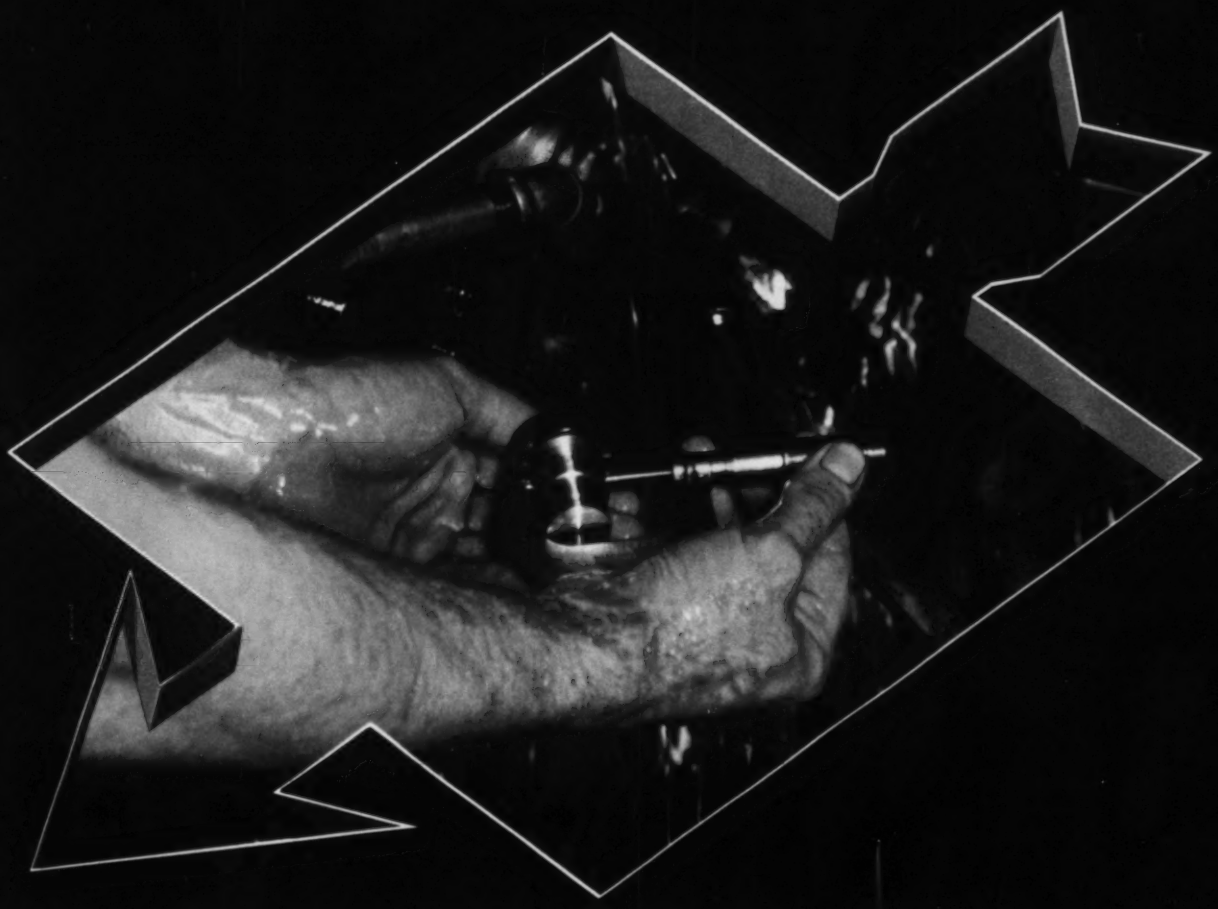
BIG TWIN combination ac-dc welders work from single phase service — deliver new convenience and economy. Two a-c amperage ranges of 20-125 and 60-290 plus two d-c ranges of 18-100 and 65-290 amps master nearly every welding requirement from light gauge metal to structural pieces. Movable shunt type transformer affords infinite current adjustments. Other features include: Horizontal design for easy stacking; weather-resistant construction and Class B insulation; Miller-built semi-metallic rectifier for best d-c welding; high open circuit voltages and new weld stabilizer. This is THE all-time, all-around welder!

LITTLE TWIN ac-dc combination welder has two a-c amperage ranges of 20-115 and 60-180 plus one d-c range of 40-150. Operating from single phase service, this Miller model incorporates many design and construction features usually found only in large industrial types. These include really rugged construction, forced air cooling, new Miller semi-metallic rectifier, movable shunt type current control, new weld stabilizer and open circuit voltage in abundance. Power factor correction is available on both models. Complete specifications on either model will be sent promptly upon request.

miller ELECTRIC MANUFACTURING COMPANY, INC. • APPLETON, WISCONSIN

Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal

Quality . . . the best economy of all



He does a better job when he can see what he's doing

You increase operator efficiency as well as production when you use transparent, heavy-duty Sunicut cutting oils. Operators work better, because Sunicut oils let them see tools and workpieces, see the finish, see micrometer graduations.

Sunicut oils don't stain hands and clothing. They pump easily, wet metal fast, and give excellent extreme-pressure lubrication.

To prove to yourself the economy of Sun quality, ask your Sun representative to help you select the right grade of Sunicut for your heavy-duty cutting requirements. Or write to SUN OIL COMPANY, Dept. I-13, Philadelphia 3, Pa.

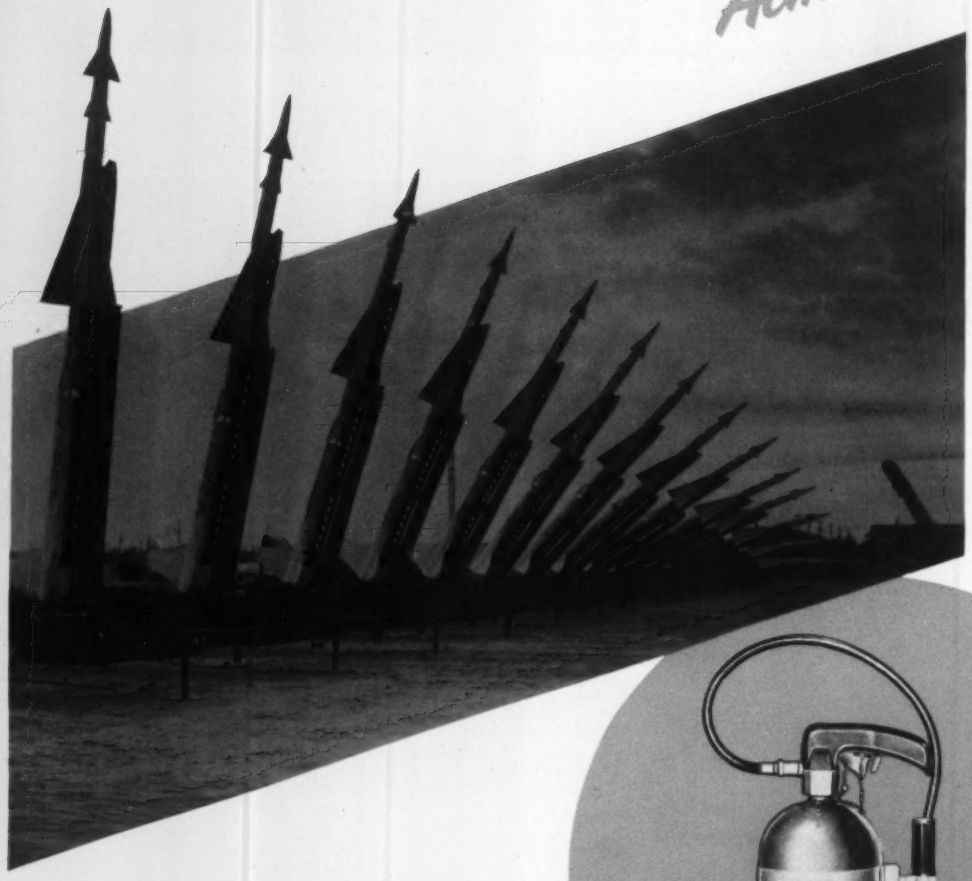
•

In Canada: Sun Oil Company Limited, Toronto and Montreal.

MAKERS OF FAMOUS CUSTOM-BLENDED BLUE SUNOCO GASOLINES

FOR PREVENTION OF FIRES AT HOME AND ABROAD

Acme-Newport Steel



Alloys from Acme-Newport become component parts of rockets, missiles and planes that discourage hot wars. Other steels, capable of severe deep drawing, form shells for earth-bound fire extinguishers in home and industry. And a thousand other products in between. After 75 years this basic steel producer has the knowledge, the personnel and the facilities to provide exceptionally good alloy and carbon grades in plate, sheet and strip. Absolute adherence to specifications is a way of life at Acme-Newport at a time when highest quality is essential to today's industry and tomorrow's very existence. Acme-Newport steel is for *you!*

Acme-Newport Steel COMPANY

NEWPORT, KENTUCKY

A SUBSIDIARY OF ACME STEEL COMPANY

'Normalcy' Returning at Gallop

PRESSURE for delivery of steel products is rapidly diminishing as users plug holes in their inventories. With labor peace assured for 29 months and consumer stocks of the most needed items increasing daily, steelmakers are convinced that they'll have to do some hard selling if they hope to maintain high production in the second quarter. The day of fending off unsolicited business and pinching out steel like gold dust has just about ended.

HEAVY PRODUCTS EASING—Take plates and structurals, for example. In strong demand at the start of the injunction period, they're rapidly opening up. March is pretty well loaded, thanks to commitments made prior to the contract signing, but April entries are spotty. Although cancellations are few, there's a tendency to push back orders. Customers requesting setbacks include heavy machinery builders whose sales have been in a slump and automotive suppliers who have surplus stocks of finished parts. Because the oil supply business is in the doldrums, there's less demand for plates used in storage tank fabrication.

OUTLOOK STILL BRIGHT—Although new orders are coming in slowly, plate and structural producers expect to run their mills at capacity through April. In wide flange beams, full production will continue through May. Sales executives are optimistic because: 1. December bookings for fabricated structural steel were the highest in 32 months. 2. Railroads ordered 10,560 new freight cars in December (vs. 2624 in November). As of Jan. 1, the backlog was 43,870 (vs. 27,596 a year earlier). 3. Demand for trunkline pipe, a big plate consumer, remains strong.

STOCKS UP, PRICES DOWN—Illustrative of the changing market situation is the recent flurry of price adjustments by service centers. In large measure, the changes reflect inventory building and keener competition for the consumer's dollar. Because deliveries from the mills have been surprisingly fast, service centers are adequately stocked in almost all lines and anxious to sell. They face stiff competition from their own suppliers (mills compete for medium size orders) and from other distributors.

Taking the initiative last Dec. 15, Seattle service centers reduced extras on stainless sheets. Two weeks ago, the St. Louis branch of U. S. Steel Corp.'s U. S. Steel Supply Div. cut prices $5.40 to $7.20 a ton on hot rolled carbon steel products. Last week, the Pittsburgh branch of Joseph T. Ryerson & Son Inc. revised quantity differentials on hot rolled carbon steel (see Page 114).

OIL COUNTRY INACTIVE—Because they were well prepared for the strike, major oil companies haven't felt an urgent need to rebuild their stocks of any products except the popular sizes of tubing and casing. Demand for the 4½ to 5½ in. sizes is still strong and supply remains tight. Bigger sizes are loosening up, partly because of cancellations from distributors who face tighter credit restrictions on their purchases. With drilling activity at the lowest level in more than 12 years (only 1673 rotary rigs are running), drill pipe business is almost dead.

OUTPUT BREAKS RECORD—Last week, the ingot rate slipped 0.2 point to 95.5 per cent of capacity. Steelmakers poured about 2,721,000 ingot tons, making January the first 12 million ton month in history.

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*Current prices were published in the Jan. 25 issue and will appear in subsequent issues.

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STEEL
QUARTERLY SURVEY

MILL PRODUCTS	CURRENT INVENTORIES					2nd Quarter FORECAST		
	UNDER 10 DAYS	10-30 DAYS	30-60 DAYS	60-90 DAYS	3-6 MONTHS	LOWER	SAME	HIGHER
HOT ROLLED CARBON BARS	5%	31%	48%	8%	8%	16%	49%	35%
COLD FINISHED BARS	—	31%	37%	17%	15%	16%	59%	25%
H & C-R SHEETS, STRIP	10%	33%	26%	25%	6%	16%	39%	45%
LIGHT PLATES	7%	19%	38%	24%	12%	23%	39%	38%
HEAVY PLATES	10%	13%	36%	28%	13%	22%	46%	32%
STRUCTURAL SHAPES	12%	23%	32%	21%	12%	16%	45%	39%
COPPER & BRASS	3%	19%	41%	19%	18%	25%	69%	6%
ALUMINUM	3%	15%	56%	15%	11%	12%	72%	16%

FIGURES are percentages of respondents to STEEL's quarterly survey.
COLOR UNDERSCORED figures show how most respondents reported.

Stocks Rise; Heavy Buying Ahead

Despite continued delivery problems, steel inventory rebuilding has been surprisingly fast. Outlook: Hefty purchases to meet the needs of the 1960 boom

MORE THAN 66 per cent of the respondents to STEEL's quarterly survey of metal buyers report ferrous reserves sufficient to last 30 days or more. The improvement: More than triple the percentage in that category in the last inventory analysis (Nov. 2, 1959, p. 111). But stocks are chiefly in the 10 to 60 day groups despite a surprisingly high inventory in the 60 day and over categories.

After the Taft-Hartley injunction went into effect Nov. 7, the mills were able to get into full swing much quicker than expected. Record production in the last two months and heavy output in the latter part of November made replenishment of stocks possible. Many plants which shut down because of steel shortages built up fairly good inventories before resuming operations.

• **Tight, but Bright**—The National Association of Purchasing Agents reports 68 per cent of its members anticipate that business in the first half will be better than it was in the like period of 1959. Purchasing agents polled by STEEL seem to substantiate that report. About 37 per cent see inventories going up by the third quarter and 48 per cent expect no change. Only 15 per cent predict a decline.

The long range outlook is good. Although money will be tight and interest rates high, economists say short term money and credit shouldn't be too difficult to obtain (see STEEL, Jan. 18, p. 54). So inventory rebuilding should not suffer from lack of funds. Heavy buying is in the offing. But with industry going into 1960 with heavy demand for goods, excessive stockpiling seems unlikely.

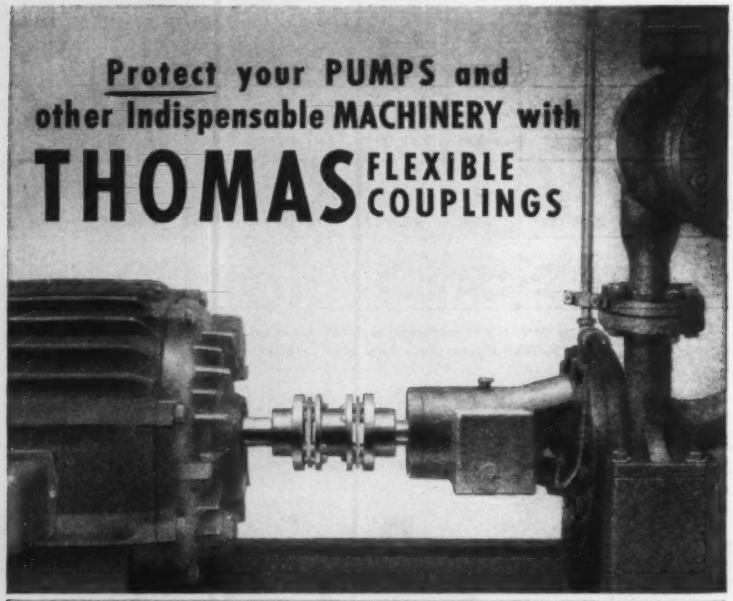
• **Deliveries Still Slow**—Despite the relatively healthy condition, more than 60 per cent of the respondents report delivery problems. Over 27 per cent of all ferrous metal buyers place sheets and strip at the top of

the trouble list. Plates and bars are also causing trouble. Bright note: Only 6 per cent reveal difficulties with "all steel products" compared with 17 per cent on Nov. 2.

Sheet and strip capacity and the speed with which such goods can be produced have sparked the optimism for increased levels by the start of the third quarter. Good demand for hot rolled carbon bars has kept reserves from equaling those of other steel products.

• **Aluminum**—Some of the stocks built up in anticipation of an aluminum strike have been liquidated. Inventories are now returning to "normal." About 72 per cent expect stocks to be at present levels when the third quarter appears. Only 16 per cent see an increase. Twelve per cent anticipate a drop.

• **Copper**—Even though the partial strike of the copper industry has kept many buyers from getting all of that metal they want, the supply situation is amazingly good. But with steel back in high gear, copper demand should rise, accounting for the 30 per cent of the buyers who see a decline in present inventory levels by the end of the quarter. Copper is expected to remain tight, but a serious shortage is not expected. Nearly 70 per cent of the respondents say inventories will be the same by the end of the present three month period.



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WARREN, PENNSYLVANIA, U.S.A.

Ryerson's New Quantity Schedule at Pittsburgh Lowers Prices $1 a Ton

Revisions in its Pittsburgh service center pricing structure on hot rolled carbon steel products (largely changes in quantity differentials covering structurals, plates, bars, sheets, and strip) were effected Jan. 25 by Joseph T. Ryerson & Son Inc. The over-all effect is a price reduction of about $1 a ton for area customers as a group, though both increases and decreases are involved in the change.

This is the first change in Ryerson's schedule of differentials put into effect about nine months ago. It's based on experience which indicated the need for revising differentials to more accurately reflect variations in handling costs.

Important reductions are made where small items are combined in orders totaling 400 lb or more. For example, there's a savings of $1.50 per 100 pounds compared with previous prices when items under 100 lb are included in a 400 lb order. The buyer of 100, 200, or 300 lb items will find costs reduced $1.40 per 100 pounds when he combines items into a 1000 lb order.

The increases apply principally to single items purchased alone in small quantities. For example, the price of a 400 lb single item is up $1.25 per 100 pounds, and a 100 lb single item costs $2.25 per 100 pounds more than formerly.

No change was made on items of 1000 lb or more when included in a total order of 5000 lb or more.

Whether other service centers in Pittsburgh will follow the change remains to be seen. Except for Buffalo, where the differentials are being placed in effect for the first time, no other districts are immediately affected. However, it's said Cleveland sellers probably will adopt the new Pittsburgh schedule where the two territories overlap.

Distributors . . .

Prices, Page 128

Service centers are receiving substantial orders, but they are not experiencing as strong pressure for deliveries as they had expected. Activity is chiefly in flat rolled items; structurals and other building items are lagging. That is due in part to seasonal conditions and to the small backlogs of some structural shops.

Revamping of quantity differentials in the Pittsburgh market, resulting in decreases and increases there, have not yet been followed in other areas.

Prices Cut on Additional Ferroalloy Products

Further price reductions have been made on various ferroalloys. A week ago, leading makers lowered prices on ferromanganese and spiegeleisen. Union Carbide Metals Co., a division of Union Carbide Corp., followed with reductions of 1 to 3.1 cents a pound on certain manganese alloys. The new prices were made effective Jan. 21.

Standard ferromanganese was reduced 1.25 cents per pound to a new base price of 11 cents per pound of material, f.o.b. shipping point. That is equal to the $25 a ton reduction announced earlier by another maker.

Silicomanganese prices were cut 1.2 to 1.3 cents per pound of alloy.

Medium carbon ferromanganese is quoted 24 cents per pound of manganese, down 1.5 cents per pound.

Price reductions were also made on Mantemp exothermic ferromanganese, low carbon ferromanganese, ferromanganese briquets, and silicomanganese briquets. Certain grades of low carbon ferromanganese were reduced 1.6 to 3.1 cents a pound.

The company also announced lower prices for Simplex low carbon ferrochrome and 40/43 ferrochrome-silicon, decreases amounting to 1 to 2 cents per pound of chromium, effective Jan. 22.

The 40 per cent chromium, 43 per cent silicon grade of ferrochrome-silicon was reduced 2 cents per pound of chromium.

Following the recent reduction in ferromanganese prices, New Jersey Zinc Co. lowered its prices on spiegeleisen $2.50 a gross ton on 10 lb pigs, and $4.50 on lumps (35 lb and down).

Steel Bars . . .

Bar Prices, Page 123

While hot rolled carbon bar demand is somewhat slower, there have been no cancellations or deferments of significance, and, in general, business continues brisk, especially for sizes rolled on the 13 and 14 in. mills.

All major steel products are under allocation over the first half of the year. Allocations are regarded as necessary for the first quarter, but some people are beginning to question the need for them for all products in second quarter, particularly on plates, structurals, and bars.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 124 & 125

While the sheet mills anticipate strong demand throughout the first six months of this year, some con-

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THE LARGEST INDEPENDENT MANUFACTURER OF ABRASIVES — PRODUCING THE FINEST STEEL MALLEABLE AND CHILLED SHOT AND GRIT ON THE MARKET

sumers are indicating they will not need as much tonnage as they thought they would. At the same time, others are seeking more tonnage than the mills have been willing to enter on order books for them.

Some evidence indicates second quarter demand will be slower, but makers generally think there'll be enough volume to support high level operations. They do anticipate an appreciable drop in the third quarter, except in coated sheets, for which demand has been far outstripping supply.

Plates . . .

Plate Prices, Page 123

With sheared plates available for delivery in March, orders are coming through slowly for the second quarter. One producer says his allotments for April haven't been taken up in many cases, and another now thinks "quotas won't mean a thing in second quarter."

Shipwork is lagging, especially with some of Bethlehem's eastern shipyards strikebound. There is little new line pipe work and structural fabricators are exerting little pressure for tonnage. Capital expenditures by the petroleum industry continue disappointing.

Alloy specialties and clad plate can be had for delivery within eight weeks from some producers.

Tubular Goods . . .

Tubular Goods Prices, Page 127

Buying pressure is off in the tubular goods market. Supply of commercial pipe for nearby shipment is plentiful.

Oil well drilling activity is low, Hughes Tool Co.'s latest survey showing 1617 rigs operating in the week ended Jan. 18. The count was substantially under the 1822 rigs operating in the same week a year ago.

Republic Steel Corp. has issued a card of mill discounts (No. 1) on electric resistance weld, light wall black line pipe, plain ends, applying to grades A and B. It's dated Jan. 15.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 129

Eastern Gas & Fuel Associates will discontinue production of metallurgical coke Apr. 30 at Everett, Mass. Natural gas instead of mixed gas will be supplied Greater Boston utilities. Production of 108 byproduct ovens with annual capacity of 664,000 net tons of coke will be affected.

The company will continue to operate coke plants at New Haven, Conn., and Philadelphia.

Pig iron production was discontinued at Everett (Mystic Iron Works) in the fourth quarter of last year.

Structural Shapes . . .

Structural Shape Prices, Page 123

Inquiry for structural steel is better, but ordering continues to lag. This situation, combined with high production, is resulting in easier deliveries on plain material. Standard shapes are available for shipment in March, and even some wide flange tonnage can be had for late March and early April delivery.

December structural bookings were the highest in 32 months, reports the American Institute of

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Steel Construction. Awards totaled 366,125 tons, 41 per cent more than in November, and almost 170,000 more than in the like 1958 period.

Total 1959 bookings were 3,222,858 tons, up 16 per cent from the 2,773,444 placed in 1958.

A sharp gain was registered by shipments in December, totaling, 235,688 tons vs. 180,772 in November. However, it was off 12 per cent from the 266,600 tons moved in December, 1958. Shipments for all of 1959 were 2,904,409 tons, off 21 per cent from the 3,664,247 moved in 1958.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

8700 tons, steam plant, Unit 1, Tennessee Valley Authority, Paradise, Ky., to Ingalls Iron Works Co., Birmingham.

4300 tons, sixth unit, powerplant addition, Wisconsin Electric Power Co., Milwaukee, to five fabricating shops; Worden Allen Co., Wisconsin Bridge & Iron Co., Milwaukee Bridge Co., Lakeside Bridge & Steel Co., and American Bridge Div., U. S. Steel Corp.; direct by owner, H. E. Mundt, chief structural engineer.

3100 tons, brewery, Carling Brewing Corp., Halethorpe, Md., to Lehigh Structural Steel Co., Allentown, Pa.; Consolidated Engineering Co. Inc., Baltimore, general contractor.

2200 tons, Fiberglas plant, Owens-Corning Corp., Aiken, S. C., to Owen Steel Co. and Kline Iron & Steel Co.; Daniel Construction Co., Greenville, S. C., general contractor.

1500 tons, gates, guides, and appurtenances, John Day Dam, to Pacific Car & Foundry Co., Seattle; C. J. Montag & Sons and associates, Portland, Oreg., joint contractors.

1000 tons, finishing plant, J. P. Stevens & Co., Cheraw, S. C., to Kline Iron & Steel Co., Greenville, S. C.; Daniel Construction Co., Greenville, general contractor.

980 tons, state bypass, Stroudsburg, Pa., through John H. Beers Inc., general contractor, to High Welding Co., Lancaster, Pa.

850 tons, Peterbilt Motors Co., Newark, Calif., plant; subsidiary of Pacific Car & Foundry Co., Seattle, to Bechtel Corp., San Francisco.

705 tons, transistor manufacturing plant, Clevite Products Corp., Waltham, Mass., to West End Iron Works, Cambridge, Mass.; Vappi & Co. Inc., Cambridge, general contractor.

650 tons, Univac Engineering Center and office, Remington Rand Div., Sperry Rand Corp., Whitpain Township, Montgomery County, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

335 tons, wide flange, Navy, General Stores Supply Office, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

325 tons, incinerator, unit No. 2, Folcroft, Pa., to O'Neil Steel Co.

315 tons, research laboratory, Rohm & Haas Co., Bristol, Pa., to Frank M. Weaver Co., Lansdale, Pa.

300 tons, historical library, Du Pont interests, Greenville, Del., through Baton Construction Co., general contractor, to Bethlehem Fabricators, Bethlehem, Pa.

285 tons, junior-senior high school, Wilmington, Del., to Concrete Supply & Steel Co., Atlantic City, N. J.; D. M. Fontana Construction Co. Inc., Wilmington, general contractor; 75 tons of concrete reinforcing bars to Bethlehem Steel Co., Bethlehem, Pa.

240 tons, radio and administrative facilities, U. S. Naval Station, Cutler, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Franchi Construction Co. Inc., West Newton, Mass., general contractor.

200 tons, state bridgework, LR 1004, Chester County, Pennsylvania, to High Welding Co., Lancaster, Pa.

175 tons, also 40 tons of reinforcing, Washington State, Kettle River Bridge, to Poole, McGonigle & Dick, Portland, Oreg.; Henry Hagman, Spokane, Wash., general contractor.

155 tons, high school, Duxbury, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; 85 tons (bar joists) and 70 tons (structurals) to Groisser & Shlager Iron Works, Somerville, Mass.; Tornabene Bros. Co., Newton, Mass., general contractor; reinforcing bars to Bethlehem Steel Co.

150 tons, Wyth and Marshall High Schools, Richmond, Va., to Montague & Betts Co., Lynchburg, Va.; Daniel Construction Co., Richmond, general contractor.

135 tons, state higway structures, Shelby County, Tennessee, to American Bridge Div., U. S. Steel Corp., Pittsburgh; S. & W. Construction Co., Memphis, Tenn., general contractor.

120 tons, state bridge, Millcreek, Del., to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

7500 tons, extension, Chevrolet assembly plant, Baltimore; George H. Miehls and Albert Kahn Associates, Detroit, engineers in charge.

2100 tons, extension, Fisher Body plant, Baltimore; George H. Miehls and Albert Kahn Associates, Detroit, engineers.

2000 tons, section, Jones Falls Expressway (municipal project), Baltimore.

1500 tons, Montana state bridge, Great Falls, Mont.; bid date canceled for futher study; will be reinstated later.

900 tons, municipal jail, Rikers Island, New

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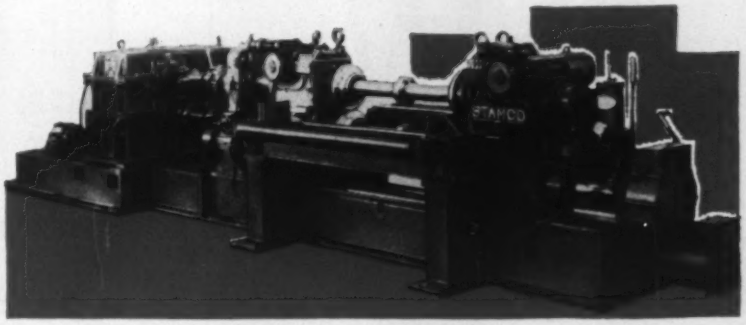

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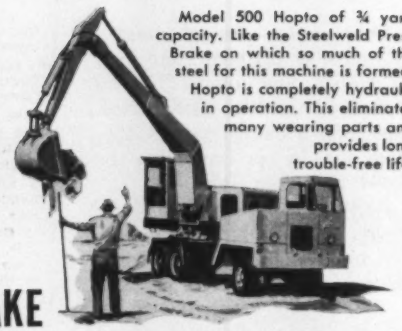
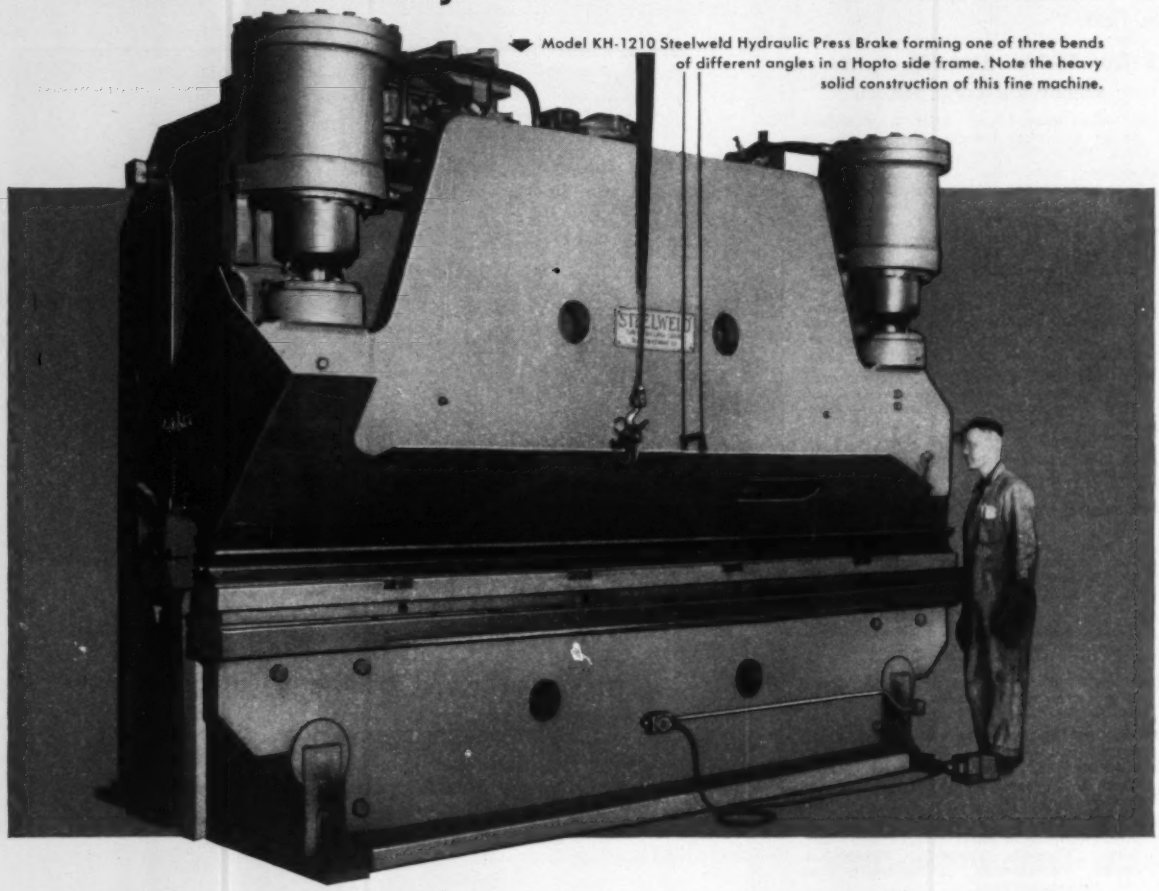
Practically all bends in the steel in these booms for Model 500 Hoptos were produced on the press brake below.



Model 500 Hopto of ¾ yard capacity. Like the Steelweld Press Brake on which so much of the steel for this machine is formed, Hopto is completely hydraulic in operation. This eliminates many wearing parts and provides long trouble-free life.

STEELWELD HYDRAULIC PRESS BRAKE Forms 90% Of Heavy Plate Bends For Hopto Backhoes

Model KH-1210 Steelweld Hydraulic Press Brake forming one of three bends of different angles in a Hopto side frame. Note the heavy solid construction of this fine machine.



A 400 ton Steelweld Hydraulic Press Brake is a key machine in the production of Hopto Backhoes at The Warner & Swasey Company, Badger Division, Winona, Minnesota. 90% of the many bends on various thickness plates required in the Hopto construction are made on the Steelweld machine.

The press brake has speeded production enormously because bends of different degrees can be made quickly and repeatedly on a simple set of four-way dies by presetting a ram adjustment. This determines the length of ram travel and makes possible changing the setting from one angle to another in about the time required to snap one's fingers.

The machine delivers accurate bends to close tolerances. It is easy and safe to operate. Although it is practically always in use, no time is lost for servicing. It has proven to be a big help in lowering production costs.

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York; Gerace & Castagna, Manhasset, N. Y., low on the general contract.

650 tons, state bridgework, Bucks County, Pennsylvania, bids Feb. 19; 590 tons of reinforcing steel also required.

527 tons, five state bridges, Waterbury-Cheshire, Conn.; Brunalli Construction Co., Southington, Conn., low; also 725 tons, reinforcing, including 400 tons of mat reinforcement.

500 tons or more, exposition coliseum, Seattle; Howard S. Wright Construction Co., Seattle, low at $3,036,934 to Washington State, Department of Commerce.

342 tons, state bridgework, Bergen and Passaic Counties, New Jersey; bids Feb. 10.

318 tons, General Stores Supply Office, Navy, Philadelphia; bids Jan. 25.

316 tons, Cowlitz River bridge, Washington State; bids to Olympia, Wash., Feb. 3.

278 tons, state bridgework, Lehigh County, Pennsylvania; bids Feb. 19.

275 tons, Montana State bridge, Custer County; Sorinsen and Tri-State, Fargo, N. Dak., low at $324,466.

275 tons, Montana state overpass and bridge, Custer County; bids to Helena, Mont., Jan. 20.

256 tons, two-span, rolled beam bridge, Cheshire-Southington, Conn.; White Oak Excavators Inc., Plainville, Conn., low; also 185 tons of reinforcing steel, including 85 tons of mat reinforcement.

250 tons, tee-sections, General Stores Supply Office, Navy, Philadelphia; bids Feb. 3.

210 tons, state bridgework, Lackawanna County, Pennsylvania; bids Feb. 19.

150 tons, 360 ft Montana state, Yellowstone River highway span; bids to Helena, Mont., Jan. 20.

150 tons, Yellowstone River bridge, Montana State project; Schultz & Lindsay, Fargo, N. Dak., low at $126,485.

120 tons, including reinforcing bars, railroad overpass, Rumford, Maine; Reed & Reed, Woolwich, Maine, low on the general contract.

348 tons, dental school, University of Kentucky, Lexington, Ky., to Connors Steel Div., H. K. Porter Company Inc., Birmingham; Foster Creighton Co., Nashville, Tenn., general contractor; 63 tons, structurals to Standard Iron & Wire Works Inc.

345 tons, addition to Washington State College, Bellingham, Wash., to Pacific Coast Div., Bethlehem Steel Co., Seattle; Elford Construction Co., Bellingham, general contractor.

250 tons, academic buildings, Brandeis University, Waltham, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; George B. H. Macomber Co., Boston, general contractor.

230 tons, radio and administrative facilities, U. S. Naval Station, Cutler, Maine, to Bethlehem Steel Co., Bethlehem, Pa.; Franchi Construction Co., West Newton, Mass., general contractor.

225 tons, transistor manufacturing plant, Clevite Products Corp., Waltham, Mass., to Concrete Steel Co., Boston; Vappi & Co. Inc., Cambridge, Mass., general contractor.

225 tons, engineering building, Tufts University, Medford, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Tornabene Bros. Co., Newton Upper Falls, Mass., general contractor; structurals, to Bethlehem Fabricators Inc., Bethlehem, Pa.

175 tons, Bureau of Public Roads bridge, Whatcom County, Washington State, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Parker Construction Co., general contractor.

150 tons, finishing plant, J. P. Stevens & Co., Cheraw, S. C., to Southern Steel Products Co. Inc., Gastonia, N. C.; Daniel Construction Co., Greenville, S. C., general contractor.

116 tons, dormitory-student union building, Trinidad Junior College, Trinidad, Colo., to Colorado Builders' Supply Co., Denver; Lembke Construction Co., Colorado Springs, Colo., general contractor.

100 tons, Fiberglas plant, Owens-Corning Co., Aiken, S. C., to Owen Steel Co., Atlanta; Daniel Construction Co., Greenville, S. C., general contractor.

60 tons, St. Bernadette parish house, Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Dahlgren Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

1470 tons, deck, Woodrow Wilson Memorial Bridge, Potomac River; bids Feb. 25, Bureau of Roads, Department of Commerce, Arlington, Va.

835 tons, bridge substructure and grading, Washington channel span; bids Feb. 1, highway department, District of Columbia.

785 tons, including structurals, Anacostia Freeway bridge, Oxon Run Bay; bids Feb. 3, highway department, District of Columbia.

590 tons, state bridgework, Bucks County, Pennsylvania; bids Feb. 19; 650 tons of structural shapes also required.

450 tons, Ravenna freeway, Seattle; Erickson Paving Co., Bellevue, Wash., low at $1,401,680 to Washington State.

435 tons, Cowlitz River bridge, Washington State; bids to Olympia, Wash., Feb. 3.

181 tons, state bridgework, Bergen and Passaic Counties, New Jersey; bids Feb. 10.

150 tons, also 125 tons of structurals, Hope Valley pumping plant, near Quincy, Wash.; bids to the Bureau of Reclamation, Denver, probably in February.

55 tons, 290 ft Lolo Pass highway bridge, Idaho; Goodfellow Bros. Inc., Wenatchee, Wash., low at $1,088,031 to Bureau of Public Roads, Boise, Idaho.

Unstated, Montana state bridge and overpass, Custer, Park, Rosebud, and Prairie counties; bids to Helena, Mont., Jan. 20.

Unstated, Oregon state highway projects, low bids, awards pending: Clatsop County, 270 ft span, Lockyear & White Inc., Longview, Wash., $44,346; Jackson County, 686 ft deck girder overpass, S. & D. Construction Co., Portland, Oreg., $496,402; Lane County.

REINFORCING BARS . . .

REINFORCING BARS PLACED

3400 tons, Tacoma's Mayfield Dam, Cowlitz River, to Pacific Coast Div., Bethlehem Steel Co., Seattle, by Perini Co. of Massachusetts, general contractor; balance of 10,000 tons of reinforcing involved to be furnished by Tacoma under a previous award

2800 tons, Capital Hill section, Seattle Freeway, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Morrison, Knudsen and Rumsey & Co., Seattle, joint general contractors.

1900 tons, sixth unit, powerplant addition, Wisconsin Electric Power Co., Milwaukee, to W. H. Pipkorn Co., Milwaukee.

1340 tons, Washington State, Ravenna Boulevard freeway section, Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle; MacRae Bros., Seattle, general contractor.

1300 tons, north section, Seattle Freeway, to Pacific Coast Div., Bethlehem Steel Co., Seattle; Macrae Bros., Seattle, general contractor.

1280 tons, brewery, Carling Brewing Corp., Halethorpe, Md., to Bethlehem Steel Co., Bethlehem, Pa.; Consolidated Engineering Co. Inc., Baltimore, general contractor.

1240 tons, Wyth and Marshall High Schools, Richmond, Va., to Montague-Betts Co., Lynchburg, Va.; Daniel Construction Co., Richmond, general contractor.

800 tons, military installation, Marshall Islands, to Alaska Steel Mills Inc., Seattle; Pacific Constructors & Associates, general contractor.

750 tons, seven highway bridges, Shelby County, Tennessee, to Laclede Steel Co., St. Louis; S. & W. Construction Co., Memphis, Tenn., general contractor.

450 tons, Seattle Freeway and tunnel, Washington State project, to Northwest Steel Rolling Mills Inc., Seattle; Erickson Paving Co., general contractor.

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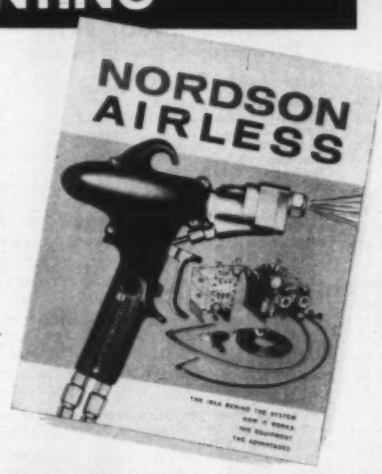

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five grade separations, total length, 1227 ft, Sig Andersson, Coos Bay, $357,870, same firm $389,769 for six interchange structures, also in Lane County; Marion County, four grade structures, total length 655 ft, Birkemeier Construction Co., Milwaukee, Oreg., $217,376.

PLATES . . .

PLATES PLACED

285 tons, alloy, General Stores Supply Office, Navy, Philadelphia, to Colorado Fuel & Iron Corp., Wilmington, Del.; 145 tons, welding electrodes, to Perma Latem Welding Alloys Inc., Red Bank, N. J.

188 tons, General Stores Supply Office, Navy, Philadelphia, to C. Itoh & Co. (America) Inc., New York; also 208 tons of carbon steel sheets.

180 tons, stainless, General Stores Supply Office, Navy, Philadelphia, to Ingersoll Steel Div., Borg-Warner Corp., Chicago (82), Eastern Stainless Steel Corp., Baltimore (70), and Morrison Steel Co., New Brunswick, N. J. (28).

100 tons, two water tanks, to Chicago Bridge & Iron Co., Seattle, by Edmonds, Wash., Water District.

PLATES PENDING

Unstated, 8 mile section of Wishkah water supply line, Aberdeen, Wash.; Cunningham & Associates, Portland, will prepare plans.

Unstated digesters and tanks, St. Regis Paper Co. plant, Tacoma, Wash.

Unstated, bulkhead and accessories; bids in to Umatilla Port Commission, Oregon, Mar. 2; plans by Cornell, Howland, Hayes & Merryfield, Corvallis, Oreg.

PIPE . . .

CAST IRON PIPE PENDING

360 tons, 3 to 8 in. water pipe; bids to Everett, Wash., Feb. 3.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Central of Georgia, eight 1800 hp diesel-electric locomotives, to Electro-Motive Div., General Motors Corp., LaGrange, Ill.

Chicago, Illinois Midland, two road switchers to the Electro-Motive Div., LaGrange, Ill.

Great Northern, eighteen 2000 hp diesel-electro road switchers, to Electro-Motive Div., General Motors Corp., LaGrange, Ill.

Lake Superior & Ishpeming, one 1800 hp diesel-electric road switcher, to Alco Products Inc., New York.

RAILROAD CARS PLACED

Canadian Pacific, 500 fifty-ton insulated all-steel boxcars, to National Steel Car Corp., Ltd., Hamilton, Ont.

Wabash, 900 fifty-ton boxcars, 550 to the St. Louis plant of ACF Industries Inc., and 350 to the railroad's own shops at Decatur, Ill.; cast steel underframe ends and bolsters will be supplied by General Steel Castings Corp., Granite City, Ill.

Central of Georgia, ten flatcars, to Ortner Co., Cincinnati.

American Refrigerator Transit Co., 100 seventy-ton steel sheathed mechanical refrigerator cars, to Pacific Car & Foundry Co., Renton, Wash.

RAILROAD CARS PENDING

Central of Georgia Railway, 100 covered hoppercars; bids asked.

New York Central, plans to acquire 2200 freight cars this year, including 1600 hoppercars, 300 boxcars, and 200 flatcars.

RAILS PLACED

New York Central, 20,000 tons to Bethlehem Steel Co., and U. S. Steel Corp., Pittsburgh; shipments start this month and continue through May. The rails will be welded.

Shipments of Steel Products—November, 1959

(All Grades—Carbon, Alloy, Stainless)

(Net Tons)

Products	Carbon	Alloy	Stainless	Total 11 Months 1959	1958
Ingots	37,127	10,942	2,067	269,334	248,390
Blooms, slabs, etc.	103,230	34,872	1,372	1,275,445	1,012,718
Tube rounds	685	287	....	13,497	9,149
Skelp	1,400	.....	....	39,213	106,548
Wire rods	57,308	2,385	1,165	856,983	809,887
Structurals (heavy)	292,308	2,477	....	3,564,591	3,615,483
Steel piling	20,280	3	....	296,234	405,376
Plates	407,862	23,554	2,315	5,065,850	4,766,811
Rails (standard)	8,709	.....	....	539,555	500,569
Rails (all other)	3,018	.....	....	33,401	35,991
Joint bars	1,661	.....	....	27,584	32,372
Tie plates	5,516	.....	....	132,062	101,442
Track spikes	3,970	.....	....	45,984	37,866
Wheels	17,943	29	....	206,525	145,845
Axles	6,059	.....	....	83,736	66,040
Bars (hot rolled)	389,529	108,711	3,820	6,035,517	5,067,426
Bars-reinforcing	162,597	.....	....	1,961,202	1,891,763
Bars (cold finished)	66,313	13,830	5,537	1,248,573	913,189
Tool steel	1,169	7,207	....	86,359	63,435
Standard pipe	171,329	31	....	1,927,754	2,018,855
Oil country goods	96,753	16,960	....	1,883,669	1,026,217
Line pipe	136,447	.....	....	2,534,157	2,463,217
Mechanical tubing	49,421	20,996	243	874,804	496,325
Pressure tubing	13,418	3,429	870	231,768	222,531
Drawn wire	182,662	3,014	1,984	2,404,081	2,157,854
Nails & staples	33,862	.....	....	347,979	396,168
Barbed wire	2,652	.....	....	45,348	53,459
Woven wire fence	6,847	.....	....	132,992	151,282
Bale ties, etc.	1,616	.....	....	51,962	55,501
Black plate	30,605	.....	....	504,838	587,841
Tin plate (HD)	21,782	.....	....	380,636	431,555
Tin plate (electro)	296,641	.....	....	4,394,431	4,889,248
Sheets (hot rolled)	556,605	16,583	1,425	6,888,924	5,597,134
Sheets (cold rolled)	909,910	3,768	10,643	11,154,596	9,072,705
Sheets (galvanized)	196,644	.....	.....	2,468,904	2,562,376
Sheets (other coated)	19,092	.....	.....	251,025	164,783
Elec. sheets & strip	1,268	42,854	.....	561,445	427,659
Strip (hot rolled)	85,612	1,344	401	1,107,470	930,672
Strip (cold rolled)	78,594	1,082	16,977	1,240,293	880,504
Total shipments (1959)	4,478,444	314,358	48,819	61,169,221	.....
Total shipments (1958)	4,818,441	319,757	48,683	.....	54,416,186

Data from the American Iron & Steel Institute.

DISTRICT INGOT RATES

(Percentage of capacity engaged)

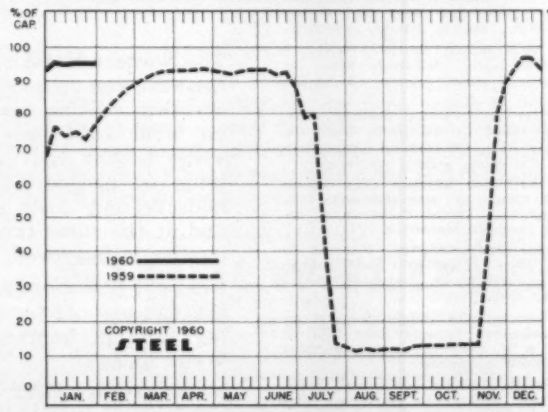
	Week Ended Jan. 31	Change	Same Week 1959	1958
Pittsburgh	96.5	0*	77	57
Chicago	94	0.5*	84	56.5
Eastern	95	— 1	76	74
Youngstown	99	0	66	54
Wheeling	95	+ 3	80	55
Cleveland	100.5	+ 1.5	84	38
Buffalo	105	0	80.5	53.5
Birmingham	93.5	0	*72	53
Cincinnati	100.5	+ 2	89.5	55
St. Louis	101	— 1.5*	96.5	74
Detroit	99.5	— 7.5*	82	50.5
Western	92	— 2	85	71
National Rate	95.5	— 0.2*	76.9	54.1

INGOT PRODUCTION

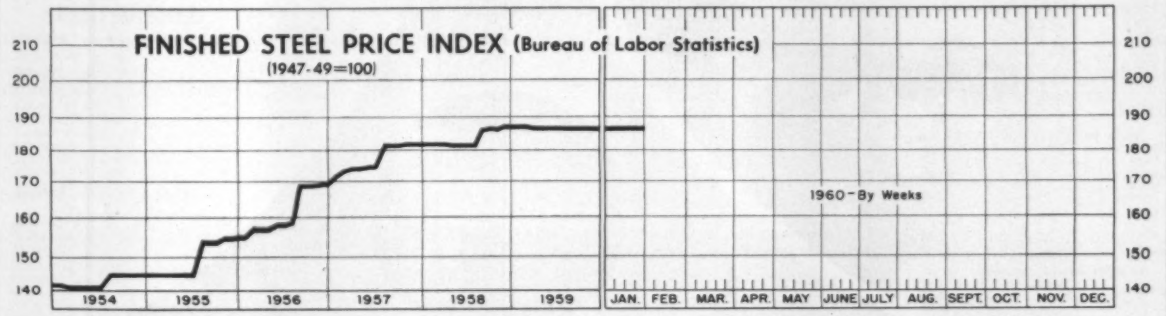
	Week Ended Jan. 31	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	168.5†	169.8	169.7	135.6
NET TONS (In thousands)	2,707†	2,727	2,726	2,178

*Change from preceding week's revised rate.
†Estimated by STEEL; comparative figures reported by AISI.
Weekly capacity (net tons): 2,849,306 in 1960; 2,831,331 in 1959; 2,699,173 in 1958.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Jan. 26, 1960	Week Ago	Month Ago	Jan. Index	Year Ago
186.8	186.8	186.8	186.8	187.0

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Jan. 26

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.765
Brass, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.585
		Pipe, Line (100 ft)	199.533
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200	Black Plate, Canmaking Quality (95 lb base box)	7.900
Tubing, Mechanical, Carbon (100 ft)	27.005	Wire, Drawn, Carbon	10.575
Tubing, Mechanical, Stainless, 304 (100 ft)	205.606	Wire, Drawn, Stainless, 430 (lb)	0.665
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100	Bale Ties (bundles)	7.967
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800	Nails, Wire, 8d Common	9.825
		Wire,Barbed (80-rod spool)	8.758
		Woven Wire Fence (20-rod roll)	21.793

STEEL's FINISHED PRICE INDEX*

	Jan. 27 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	194.53
Index in cents per lb	6.713	6.713	6.713	6.713	5.270

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$117.82
No. 2 Fdry, Pig Iron, GT.	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	42.33	42.33	41.33	41.67	35.25

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Jan. 27 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.30
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.30
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.55
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.40
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.25
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.25
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.53
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.225
Plates, Chicago	5.30	5.30	5.30	5.30	4.225
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.225
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.225
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.225
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	4.95
Sheets, C.R., Detroit	6.276	6.275	6.275	6.275	5.10
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.45
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.05
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.05
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	5.75
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	5.85
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	5.90
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	5.75
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.85
Tin plate (1.50 lb)box,Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$78.00
Wire rods, 1/2-5/8" Pitts.	6.40	6.40	6.40	6.40	4.675

PIG IRON, Gross Ton	Jan. 27 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	55.16
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld.,Cin.	70.20	70.20	70.20	70.20	60.58
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$42.50	$42.50	$41.50	$43.50	$35.75
No. 1 Heavy Melt, E. Pa.	42.00	42.00	42.00	39.00	36.00
No. 1 Heavy Melt, Chicago	42.50	42.50	40.50	42.50	34.00
No. 1 Heavy Melt, Valley	47.50	44.50	43.50	46.50	38.50
No. 1 Heavy Melt, Cleve.	43.50	41.50	40.50	43.50	33.50
No. 1 Heavy Melt, Buffalo	37.50	37.50	37.50	35.50	30.50
Rails, Rerolling, Chicago	63.50	62.50	61.50	62.50	49.50
No. 1 Cast, Chicago	55.50	55.50	54.50	47.50	40.00

COKE, Net Ton					
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.25	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	25.25

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Steel Prices

Mill prices as reported to STEEL, Jan. 27, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 124; footnotes, page 126.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ...$82.00
Bessemer,Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton,Pa. U5 .....80.00
Ensley,Ala. T2 .....80.00
Fairfield,Ala. T2 .....80.00
Fontana,Calif. K1 .....90.50
Gary,Ind. U5 .....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 .80.00
Munhall,Pa. U5 .....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ...80.00
Sterling,Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton,O. R2 .....102.00
Clairton,Pa. U5 .....99.50
Conshohocken,Pa. A3 .104.50
Ensley,Ala. T2 .....99.50
Fairfield,Ala. T2 .....99.50
Farrell,Pa. S3 .....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 .....99.50
Geneva,Utah C11 .....99.50
Houston S5 .....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 .....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 .....109.00
Sharon,Pa. S3 .....99.50
S.Chicago R2, U5, W14 99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ...109.00
Warren,O. C17 .....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$119.00
Bridgeport,Conn. C32..119.00
Buffalo R2 .....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3..126.00
Detroit S41 .....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 .....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 .....119.00
Houston S5 .....124.00
Ind.Harbor,Ind. Y1 ..119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 .....139.00
Lowellville,O. S3 .....119.00
Massillon,O. R2 .....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 .....119.00
Owensboro,Ky. G8 ...119.00
Sharon,Pa. S3 .....119.00
S.Chicago R2,U5,W14 119.00
S.Duquesne,Pa. U5 ...119.00
Struthers,O. Y1 .....119.00
Warren,O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 .....125.00
Cleveland R2 .....122.50
Gary,Ind. U5 .....122.50
S.Chicago,Ill. R2, W14 122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 .....122.50

SKELP
Aliquippa,Pa. J5 .....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren,O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 .....6.40
Alton,Ill. L1 .....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora,Pa. A7 .....6.40
Fairfield,Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 .....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 .....6.40
Pittsburg,Calif. C11 ....7.20
Portsmouth,O. P12 .....6.40
Roebling,N.J. R5 .....6.50
S.Chicago Ill. R2, W14 ..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill(1) N15 .....6.40
Sterling,Ill. N15 .....6.50
Struthers,O. Y1 .....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 ....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1 5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 .....6.25
S.Chicago, Ill. U5, W14 5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2. 5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W16 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1.8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ..5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1.5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5. W14..5.30
SparrowsPoint,Md. B2..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 .....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 .....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1.7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint, Md. B2..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l. (15) A10 ..5.55
Ashland l.c.l. (15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich.(9) G5 ....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 .....5.825
Fontana,Calif.(9) K1 ...6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ...5.675
Joliet,Ill. P2 .....5.675
KansasCity,Mo.(9) S5 ..5.925
Lackawanna(9) B2 .....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa. (23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles Calif. P1 .....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11 6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle A24, B3, N15 ..6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne Pa.(9) U5 ..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15 .5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ...5.675
Torrance,Calif.(9) C11 .6.375
Warren O. C17 .....6.052
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 ..6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2 W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ...5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5 .5.925
Lackawanna(9) B2 ....5.675
Sterling Ill. N15 .....5.775
Sterling,Ill.(1) N15 ....5.675
Tonawanda,N.Y. B12 ...5.675

BAR SIZE ANGLES; S. Shapes
Al'quippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675.
Portland,Oreg. O4 .....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

WROUGHT IRON—Bar size angles; S shapes
Economy, Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra)
Carbon
LosAngeles P2, S30 ...11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N.J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ...7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 ....7.65
Hammond Ind. J5, L2..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R8 ....7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N.J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa.M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 .....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ...9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ...9.325
Worcester,Mass. A7 ....9.325
Yougstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 ....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex(4)(26)T4 5.925
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 ....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14 .6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling Ill. (1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt. Md. B2 ....7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts. (4) C2 ....5.675
Franklin,Pa. (3) F5 ..5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O. (3) P11 ....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ...5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14 ..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 ....6.275

SHEETS, H.R., Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky. (8) A10 ..5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 ....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2 .6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(37) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2....7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2.6.875‡
Ashland Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C-16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ...6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875‡
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 CarpenterSteelofN.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union CarbideMetalsCo.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	.5.10
Allenport,Pa. P7	.5.10
Alton,Ill. L1	.5.30
Ashland,Ky.(8) A10	.5.10
Atlanta A11	.5.10
Bessemer,Ala. T2	.5.10
Birmingham C15	.5.10
Conshohocken,Pa. A3	.5.15
Detroit M1	.5.10
Ecorse,Mich. G5	.5.10
Fairfield,Ala. T2	.5.10
Farrell,Pa. S3	.5.10
Fontana,Calif. K1	.5.825
Gary,Ind. U5	.5.10
Ind.Harbor,Ind. I-2, Y1	.5.10
Johnstown,Pa.(25) B2	.5.10
Lackaw'na,N.Y.(25) B2	.5.10
LosAngeles(25) B3	.5.85
LosAngeles C1	.8.60
Minnequa,Colo. C10	.6.20
Riverdale,Ill. A1	.5.10
San Francisco S7	.6.60
Seattle(25) B3	.6.10
Seattle N14	.6.60
Sharon,Pa. S3	.5.10
S.Chicago,Ill. W14	.5.10
S.SanFrancisco(25) B3	.5.85
SparrowsPoint,Md. B2	.5.10
Torrance,Calif. C11	.5.85
Warren,O. R2	.5.10
Weirton,W.Va. W6	.5.10
Youngstown U5	.5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	.8.40
Farrell,Pa. S3	.8.40
Gary,Ind. U5	.8.40
Houston S5	.8.65
Ind.Harbor,Ind. Y1	.8.40
KansasCity,Mo. S5	.8.65
LosAngeles B3	.9.60
Lowellville,O. S3	.8.40
Newport,Ky. A2	.8.40
Sharon,Pa. A2, S3	.8.40
S.Chicago,Ill. W14	.8.40
Youngstown U5, Y1	.8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	.7.575
Bessemer,Ala. T2	.7.575
Conshohocken,Pa. A3	.7.575
Ecorse,Mich. G5	.7.575
Fairfield,Ala. T2	.7.575
Farrell,Pa. S3	.7.575
Gary,Ind. U5	.7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	.7.575
LosAngeles(25) B3	.8.325
Seattle(25) B3	.8.575
Sharon,Pa. S3	.7.575
S.Chicago,Ill. W14	.7.575
S.SanFrancisco(25) B3	.8.325
SparrowsPoint,Md. B2	.7.575
Warren,O. R2	.7.575
Weirton,W.Va. W6	.7.575
Youngstown U5, Y1	.7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	.5.35
Warren,O. R2	.5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	.7.425
Baltimore T6	.7.425
Boston T6	.7.975
Buffalo S40	.7.425
Cleveland A7, J5	.7.425
Dearborn,Mich. S3	.7.425
Detroit D2, M1, P20	.7.425
Dover,O. G6	.7.425
Evanston,Ill. M22	.7.525
Farrell,Pa. S3	.7.425
Follansbee,W.Va. W10	.7.425
Fontana,Calif. K1	.9.20
FranklinPark,Ill. T6	.7.525
Ind.Harbor,Ind. Y1	.7.425
Indianapolis S41	.7.575
LosAngeles C1, S41	.9.30
McKeesport,Pa. E10	.7.525
NewBedford,Mass. R10	.7.875
NewBritain,Conn. S15	.7.875
NewCastle,Pa. B4, E5	.7.425
NewHaven,Conn. D2	.7.875
NewKensington,Pa. A6	.7.425
Pawtucket,R.I. R3	.7.975
Pawtucket,R.I. N8	.7.975
Philadelphia P24	.7.875
Pittsburgh J5	.7.425
Riverdale,Ill. A1	.7.525
Rome,N.Y.(32) R6	.7.425
Sharon,Pa. S3	.7.425
Trenton,N.J.(31) R5	.8.875
Wallingford,Conn. W2	.7.875
Warren,O. R2, T5	.7.425
Worcester,Mass. A7	.7.975

STRIP, Cold-Rolled Alloy

Boston T6	.15.90
Carnegie,Pa. S18	.15.55
Cleveland A7	.15.55
Dover,O. G6	.15.55
Farrell,Pa. S3	.15.55
FranklinPark,Ill. T6	.15.55
Harrison,N.J. S18	.15.55
Indianapolis S41	.15.70
LosAngeles S41	.17.75
Lowellville,O. S3	.15.55
Pawtucket,R.I. N8	.15.90
Riverdale,Ill. A1	.15.55
Sharon,Pa. S3	.15.55
Worcester,Mass. A7	.15.85
Youngstown S41	.15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	.10.80
Dearborn,Mich. S3	.10.80
Dover,O. G6	.10.80
Farrell,Pa. S3	.10.80
Ind.Harbor,Ind. Y1	.10.80
Sharon,Pa. S3	.10.80
Warren,O. R2	.10.80

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Ron.e,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			0.80C	1.05C	1.35C
Bristol,Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria,O. S1	...	...	19.05	22.15	....
FranklinPark,Ill. T6	...	...	19.20	23.30	28.15
Harrison,N.J. C18	...	...	18.85	22.95	27.80
New York W3	...	...	18.85	22.95	27.80
Palmer,Mass. W12	...	...	18.85	....	....
Trenton,N.J. R5	...	...	18.85	22.95	27.80
Worcester,Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	.7.425*
Dover,O. G6	.7.425*
Evanston,Ill. M22	.7.525*
McKeesport,Pa. E10	.7.50*
Riverdale,Ill. A1	.7.525*
Warren,O. B9, S3, T5	.7.425*
Worcester,Mass. A7	.7.975
Youngstown S41, Y1	.7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	.7.50
Sharon,Pa. S3	.7.50

TIGHT COOPERAGE HOOP

Atlanta A11	.5.65
Farrell,Pa. S3	.5.525
Riverdale,Ill. A1	.5.675
Sharon,Pa. S3	.5.525
Youngstown U5	.5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped 1.25 Common Coke	1.50 lb	1.75 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	.7.85
Gary,Ind. U5	.7.85
GraniteCity,Ill. G4	.7.95
Ind.Harbor,Ind. Y1	.7.85
Irvin,Pa. U5	.7.85
Yorkville,O. W10	.7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70
Vandergrift,Pa. U5	..	17.10	18.10	19.70	20.20	20.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	.8.00
Aliquippa,Pa. J5	.8.00
Alton,Ill. L1	.8.20
Atlanta A1	.8.00
Bartonville,Ill. K4	.8.10
Buffalo W12	.8.00
Chicago W13	.8.00
Cleveland A7, C20	.8.00
Crawfordsville,Ind. M8	.8.10
Donora,Pa. A7	.8.00
Duluth A7	.8.00
Fairfield,Ala. T2	.8.00
Fostoria,O.(24) S1	.8.10
Houston S5	.8.25
Jacksonville,Fla. M8	.8.35
Johnstown,Pa. B2	.8.00
KansasCity,Mo. S5, U3	.8.10
LosAngeles B3	.8.25
Lowellville,O. S3	.8.10
Kokomo,Ind. C16	.8.10
LosAngeles B3	.8.95
Minnequa,Colo. C10	.8.25
Monessen,Pa. P7	.8.00
Palmer,Mass. W12	.8.30
Pittsburg,Calif. C11	.8.95
Portsmouth,O. P12	.8.00
Rankin,Pa. A7	.8.00
S.Chicago,Ill. R2	.8.00
S.SanFrancisco C10	.8.95
SparrowsPoint,Md. B2	.8.10
Sterling,Ill.(1) N15	.8.00
Sterling,Ill. N15	.8.10
Struthers,O. Y1	.8.00
Waukegan,Ill. A7	.8.00
Worcester,Mass. A7	.8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	.8.00

Wire, Gal'd., for ACSR

Bartonville,Ill. K4	.12.65
Buffalo W12	.13.40
Cleveland A7	.12.65
Donora,Pa. A7	.12.65
Duluth A7	.12.65
Johnstown,Pa. B2	.13.40
KansasCity,Mo. U3	.12.90
Minnequa,Colo. C10	.12.775
Monessen,Pa. P7, P16	.12.65
Muncie,Ind. I-7	.13.60
NewHaven,Conn. A7	.12.95
Palmer,Mass. W12	.13.70
Pittsburg,Calif. C11	.13.45
Portsmouth,O. P12	.12.65
Roebling,N.J. R5	.12.95
SparrowsPt.,Md. B2	.13.50
Struthers,O. Y1	.13.40
Trenton,N.J. A7	.12.95
Waukegan,Ill. A7	.12.65
Worcester,Mass. A7	.12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	.9.75
Alton,Ill. L1	.9.95
Buffalo W12	.9.75
Cleveland A7	.9.75
Donora,Pa. A7	.9.75
Duluth A7	.9.75
Johnstown,Pa. B2	.9.75
KansasCity,Mo. S5, U3	.10.00
LosAngeles B3	.10.70
Minnequa,Colo. C10	.9.95
Monessen,Pa. P7, P16	.9.75
NewHaven,Conn. A7	.10.05
Palmer,Mass. W12	.10.05
Pittsburg,Calif. C11	.10.70
Portsmouth,O. P12	.9.75
Roebling,N.J. R5	.10.05
S.Chicago,Ill. R2	.9.75
S.SanFrancisco C10	.10.70
SparrowsPt.,Md. B2	.9.85
Struthers,O. Y1	.9.75
Trenton,N.J. A7	.10.05
Waukegan,Ill. A7	.9.75
Worcester,Mass. A7	.10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	.16.50
Bartonville,Ill. K4	.16.40
Chicago W13	.16.30
Cleveland A7	.16.30
Crawfordsville,Ind. M8	.16.40
Fostoria,O. S1	.16.30
Houston S5	.16.55
Jacksonville,Fla. M8	.16.65
Johnstown,Pa. B2	.16.30
KansasCity,Mo. S5	.16.55
Kokomo,Ind. C16	.16.30
Minnequa,Colo. C16	.16.55
Monessen,Pa. P16	.16.30
Muncie,Ind. I-7	.16.50
Palmer,Mass. W12	.16.60
S.SanFrancisco C10	.17.15
Waukegan,Ill. A7	.16.30
Worcester,Mass. A7,J6	.16.60

WIRE, Tire Bead

Bartonville,Ill. K4	.17.15
Monessen,Pa. P16	.17.15
Roebling,N.J. R5	.17.65

ROPE WIRE (A)

Bartonville,Ill. K4	.13.45
Buffalo W12	.13.45
Fostoria,O. S1	.13.45
KansasCity,Mo. U3	.13.70
Johnstown,Pa. B2	.13.45
Monessen,Pa. P7	.13.45
Muncie,Ind. I-7	.13.65
Palmer,Mass. W12	.13.75
Portsmouth,O. P12	.13.45
Roebling,N.J. R5	.13.75
St.Louis L8	.13.45
SparrowsPt.,Md. B2	.13.55
Struthers,O. Y1	.13.45
Worcester,Mass. J4	.13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

Wire, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	9.49
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	9.34

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	9.79
Pittsburg,Calif. C11	10.28
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	9.64

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	14.45
Minnequa,Colo. C10	9.84
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.69

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2.	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193*
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage)	An'ld Galv. Stone Stone
Ala.City,Ala.R2	17.85 19.40**
Aliq'ppa.Pa. J5	17.85 19.65
Bartonville K4	17.95 19.80
Cleveland A7	17.85 ....
Craw'dville B8	17.95 19.80‡‡
Fostoria,O. S1	18.35 19.90†
Houston S5	18.10 19.65**
Jacksonville M8	18.95 19.80‡‡
Johnstown B2	17.85 19.65§
Kan.City,Mo. S5	18.10 ....
Kokomo C16	17.25 18.80†
Minnequa C10	18.10 19.65**
P'im'r,Mass.W12	18.15 19.70†
Pitts.Calif. C11	18.20 19.75†
S.San.Fran. C10	18.20 19.75**
St'ling(37) N15	17.95 19.80
SparrowsPt. B2	17.95 19.75§
Waukegan A7	17.85 19.40†
Worcester A7	18.15 ....

WIRE, Merchant Quality

(6 to 8 gage)	An'd Galv.
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325§
Atlanta(48)A11	9.10 9.775§
Bartonville(48) K4	9.10 9.80
Buffalo W12	9.00 9.55†
Cleveland A7	9.00 ....
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield T2	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675§
Joliet,Ill. A7	9.00 9.55†
KansasCity(48)S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625§
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35§
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48)B2	9.10 9.775§
St'ling(37)(48) N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass.A7	9.30 9.85†

Based on zinc price of: *13.50. †5c. ‡10c. ‡‡Less than 10c. ††10.50c. §11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts, per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nuts 1¼ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only—for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American **Standard:** Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

CAP AND SETSCREWS Filister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:	
Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam, 6 in. and shorter:	
Packages	+ 5
Bulk	+19
Through 1 in. diam., longer than 6 in.:	
Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.00	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	28.95	43.40	55.40	73.00	95.10
Minnequa,Colo. C10	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2½	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.60	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+7.75
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+6.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.55	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$36.80	$44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	V-Cr Hot Work (H-13)	0.550
Spec. Carbon (W-1)	0.385	W-Cr Hot Work (H-12)	0.530
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	69.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, K2	89.00
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075%)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[3]		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	9.80[a]	10.00[b]	10.06	....	11.45[c]	10.05[d]	11.80#	16.38	9.55	9.90[e]	10.50
Birmingham	9.43[a]	10.20[b]	....	....	10.91[c]	9.59[d]	13.14#	16.76	9.00	9.79[e]	10.90
Boston	10.07	11.42	11.77	53.50	12.17	10.19	13.30#	15.64	10.64	10.27	11.95
Buffalo	8.40	9.60	11.25	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.90	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.58#	15.37	9.56	9.27	10.53
Cleveland	8.54[a]	8.79[b]	10.94	52.33	10.32[c]	8.75[d]	11.25#	15.16	9.39	8.71[e]	10.50[f]
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	9.65[a]	9.65[b]	....	52.00	10.85[c]	8.90[d]	13.10#	16.55	8.35	9.65[e]	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[3]	10.82[3]	12.20	57.60	9.15	9.10[3]	12.95[3]	16.35	9.00[3]	9.10[3]	11.30[3]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.03	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.35	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.55	10.89	52.17	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.54[a]	8.79[b]	10.76	52.33	10.30[c]	8.64[d]	11.25#	15.05	9.00	8.47[e]	10.28[f]
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.80[a]	9.31[b]	10.54	....	10.32[c]	8.70[d]	11.49#	16.54	9.38	8.60[e]	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.60	16.25	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[3]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.30	11.55	12.50	57.38	10.75	11.00	14.70	16.80	10.20	10.10	13.00
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **¼ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

[a]10 Ga.; [b]20 Ga.; [c]⅛ x 1 in.; [d]¾-2½ in.; [e]¼ x 84 in.; [f]¼ x 36 in.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [3]—30,000 lb; [8]—1000 to 4999 lb; [9]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Aisey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines; Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid $26.50-$27; barge, Brownsville, Tex., $29-$29.50.

Ores

Lake Superior Iron Ore

(Prices effective at start of the 1959 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1959, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	21.00†
Brazilian iron ore, 68.5%	21.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$17.50-18.00*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian 88-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†

South African Transvaal

44% no ratio	18.00†
48% no ratio	24.00-26.00†

Turkish

48% 3:1	36.00-37.00†

Domestic

Rail nearest seller

18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.50-2.75
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. truckiots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in. (In contract lots of 240 tons price is 22.75c)	28.75
Annealed, 99.5% Fe	36.75
Unannealed (99+% Fe)	33.25
Unannealed (99+% Fe) (minus 325 mesh)	58.25
Powder Flake (minus 16 plus 100 mesh)	29.25
Carbonyl Iron: 98.1-98.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l. 38.50; ton lots 40.50	
Antimony, 500-lb lots	42.00*
Brass, 500-lb lots	35.60-52.90†
Bronze, 5000-lb lots	54.00-57.60†.
Copper, electrolytic	14.25*
Copper, reduced	14.25*
Lead	7.50*
Manganese, Electrolytic: Minus 35 mesh	$1.00
Nickel	$1.15
Nickel-Silver, 5000-lb lots	60.90-69.70†
Phosphor-Copper, 5000-lb lots	67.00
Copper (atomized) 5000-lb lots	47.50-65.50
Solder	7.00*
Silicon	70.00*
Stainless Steel, 304	89.00*
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	21.20-34.40‡
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars nom**
Chromium electrolytic 99.8% Cr. min., metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$6.59	$6.64	$6.49	$6.34	$6.74
Bar Size Angles	6.25	6.30	6.15	6.05	6.40
Structural Angles	6.16	6.21	6.06	5.96	6.31
I-Beams	6.16	6.21	6.06	5.96	6.31
Channels	6.16	6.21	6.06	5.96	6.31
Plates (basic bessemer)	6.28	6.33	6.18	6.08	6.43
Sheets, H.R.	7.50	7.55	7.40	7.30	7.65
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	9.70	9.75	9.60	9.50	9.85
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	9.80	9.85	9.70	9.60	9.95
Sheets, C.R. (drawing quality)	10.70	10.75	10.60	10.50	10.85
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.08	24.20	24.42	24.15	25.47
Barbed Wire (†)	6.80	6.85	6.70	6.60	6.95
Merchant Bars	6.69	6.74	6.59	6.49	6.84
Hot-Rolled Bands	7.90	7.95	7.80	7.70	8.05
Wire Rods, Thomas Commercial No. 5	6.60	....	6.45	6.45	6.70
Wire Rods, O. H.	7.05	....	6.90	6.90	7.15
Bright Common Wire Nails (‡)	8.15	8.20	8.05	7.95	8.30

†Per 82 lb net reel. ‡Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.

Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	5.00
Toluene, one deg. (deld. east of Rockies)	25.00

Cents per lb, f.o.b. tank cars or tank trucks, deld.

Phenol, 90 per cent grade	14.75

Per net ton bulk, f.o.b. cars or trucks, plant

Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Neville Island, Pa., 21-23% Mn, $102.50, 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. Lump, 35 lb and down: Deduct $2 from 10 lb pig prices.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net tons, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% C grade, Si 12.5-16%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c.

Blocking Chrome: No. 1 (Cr 61-65%, C 5-7%, Si 5-8%), 22.00c; No. 2 (Cr 58-63%, C 5-6%, Si 8-10%), 23.00c; No. 3 (Cr 58-63%, C 5-6%, Si 10-12%), 23.00c.

Refined Charge Chrome: No. 1 (Cr 50-55%, C 5% max, Si 2% max), 25.00c; No. 2 (Cr 56-60%, C 5% max, Si 2% max), 25.00c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 35.75c per lb contained Cr; 0.010% max, 36.75c. Delivered.
Cr 67-71%, carload, lump, bulk, 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy, carload packed, 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr, 14.60c per lb contained Si; 0.75 in. x down, 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lots 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅜ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carlot bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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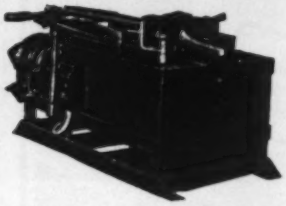

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Scrap Price Advance Is Stalled

STEEL's composite on No. 1 heavy melting grade holds at $42.33 after rising for two straight weeks. Domestic demand disappointing, but market undertone is aided by exports

Scrap Prices, Page 134

• **Chicago**—The market is quiet but prices are unchanged. The pattern for the near future likely will develop when auto body stamping plants in the area take bids on No. 1 factory bundles to be generated and shipped this month. At the end of December, bids on that type scrap averaged $45 a ton, about $1 a ton less than now quoted.

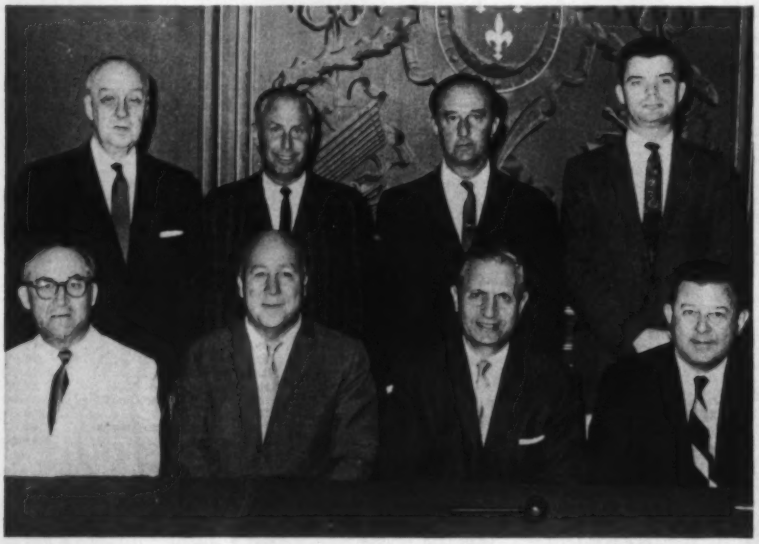
• **Pittsburgh** — Recent mill purchases confirmed prices that have been quoted for several weeks. A leading consumer bought small tonnages of No. 2 heavy melting and No. 2 bundles, paying $37 and $32 respectively. Mills are reluctant to buy.

• **Cleveland**—Volume of orders here and in the Valley has been disappointing the last week or so. Dealers and brokers are looking forward to a pickup in February with steelmaking operations continuing at a high level. Prices are unchanged. In the absence of a representative buying test, they are largely nominal. It's expected bids on monthend auto lists will point the way for the market over the next several weeks. Auto tonnage is expected to be substantial.

• **St. Louis**—The market is a little weaker. Little trading has been reported and not much material is coming into dealers' yards. The seasonal collection slump is expected to continue several weeks. Dealers aren't pushing the market because they haven't much to offer and prefer to await higher prices.

• **Philadelphia**—Domestic buying for February has been spotty, with

(*Please turn to Page* 139)



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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Jan. 27, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Jan. 27	$42.33
Jan. 20	42.33
Dec. Avg.	41.71
Jan. 1959	40.58
Jan. 1955	34.95

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	42.00-43.00
No. 2 heavy melting	36.00-37.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	31.00-32.00
No. 1 busheling	42.00-43.00
No. 1 factory bundles	51.00-52.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	23.00-24.00
Shovel turnings	*30.00-31.00*
Cast iron borings	*30.00-31.00*
Cut structurals:	
2 ft and under	50.00-51.00
3 ft and under	49.00-50.00
Heavy turnings	35.00-36.00
Punchings & plate scrap	54.00-55.00
Electric furnace bundles	52.00-53.00

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	32.00-33.00
Clean auto cast	47.00-48.00
Drop broken machinery	*56.00-57.00*

Railroad Scrap

No. 1 R.R. heavy melt.	51.00-52.00
Rails, 2 ft and under	64.00-65.00
Rails, 18 in. and under	65.00-66.00
Random rails	61.00-62.00
Angles, splice bars	59.00-60.00
Railroad specialties	59.00-60.00
Rails, rerolling	66.00-67.00

Stainless Steel Scrap

18-8 bundles & solids	230.00-235.00
18-8 turnings	120.00-125.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	42.00-44.00
No. 1 hvy melt., dealer	41.00-42.00
No. 2 hvy melting	36.00-37.00
No. 1 factory bundles	45.00-46.00
No. 1 dealer bundles	41.00-42.00
No. 2 bundles	26.00-27.00
No. 1 busheling, indus.	42.00-44.00
No. 1 busheling, dealer	41.00-42.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	25.00-26.00
Shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals, 3 ft	49.00-50.00
Punchings & plate scrap	51.00-52.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Stove plate	50.00-51.00
Unstripped motor blocks	47.00-48.00
Clean auto cast	61.00-62.00
Drop broken machinery	61.00-62.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	63.00-64.00
Rails, 2 ft and under	*61.00-62.00*
Rails, 18 in. and under	*62.00-63.00*
Angles, splice bars	55.00-56.00
Axles	59.00-60.00
Rails, rerolling	*63.00-64.00*

Stainless Steel Scrap

18-8 bundles, solids	220.00-225.00
18-8 turnings	115.00-120.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*24.50-25.50*
No. 1 bundles	*40.00-41.00*
No. 2 bundles	*22.50-23.50*
No. 1 busheling	*37.00-38.00*
Machine shop turnings	*14.50-15.50*
Mixed borings, turnings	*14.50-15.50*
Shovel turnings	*15.50-16.50*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	39.00-40.00
Heavy breakable	39.00-40.00
Unstripped motor blocks	31.00-32.00
Charging box cast	39.00-40.00
Clean auto cast	52.00-53.00

CLEVELAND

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	33.00-34.00
No. 1 factory bundles	*47.50-48.50*
No. 1 bundles	43.00-44.00
No. 2 bundles	26.00-27.00
No. 1 busheling	44.50-45.50
Machine shop turnings	16.00-17.00
Shovel turnings	22.00-23.00
Mixed borings, turnings	22.00-23.00
Cast iron borings	22.00-23.00
Cut foundry steel	43.00-44.00
Cut structurals, plate 2 ft and under	50.00-51.00
Low phos. punchings & plate	45.00-46.00
Alloy free, short shovel turnings	23.00-24.00
Electric furnace bundles	46.00-47.00

Cast Iron Grades

No. 1 cupola	55.00-56.00
Charging box cast	43.00-44.00
Heavy breakable cast	41.00-42.00
Stove plate	49.00-50.00
Unstripped motor blocks	39.00-40.00
Brake shoes	39.00-40.00
Clean auto cast	56.00-57.00
Burnt cast	47.00-48.00
Drop broken machinery	56.00-57.00

Railroad Scrap

R.R. malleable	64.00-65.00
Rails, 2 ft and under	65.00-66.00
Rails, 18 in. and under	66.00-67.00
Rails, random lengths	59.00-60.00
Cast steel	53.00-54.00
No. 1 railroad cast	58.50-59.50
Railroad specialties	57.00-58.00
Angles, splice bars	57.00-58.00
Rails, rerolling	74.00-75.00

Stainless Steel (Brokers' buying prices: f.o.b. shipping point)

18-8 bundles, solids	210.00-215.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	115.00-120.00
430 turnings	45.00-55.00

YOUNGSTOWN

No. 1 heavy melting	*47.00-48.00*
No. 2 heavy melting	36.00-37.00
No. 1 busheling	47.00-48.00
No. 1 bundles	*48.00-49.00*
No. 2 bundles	29.00-30.00
Machine shop turnings	18.00-19.00
Shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Low phos.	48.00-49.00
Electric furnace bundles	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00

BUFFALO

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	37.00-38.00
No. 2 bundles	27.00-28.00
No. 1 busheling	37.00-38.00
Shovel turnings	24.00-25.00
Machine shop turnings	20.00-21.00
Cast iron borings	22.00-23.00
Low phos. structurals and plate, 2 ft and under	45.00-46.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*47.00-48.00*
No. 1 machinery	*49.00-50.00*

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 3 ft and under	53.00-54.00
Railroad specialties	45.00-46.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	*31.00-32.00*
No. 1 bundles	*37.00-38.00*
No. 2 bundles	*26.00-27.00*
No. 1 busheling	*37.00-38.00*
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	*21.00-22.00*
Shovel turnings	*23.00-24.00*
Cast iron borings	21.00-22.00
Low phos. 18 in.	49.00-50.00

Cast Iron Grades

No. 1 cupola	49.00-50.00
Heavy breakable cast	*42.00-43.00*
Charging box cast	*42.00-43.00*
Drop broken machinery	*58.00-59.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*43.00-44.00*
Rails, 18 in. and under	*61.00-62.00*
Rails, random lengths	*53.00-54.00*

PHILADELPHIA

No. 1 heavy melting	42.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	47.00
No. 2 bundles	26.00
No. 1 busheling	47.00
Electric furnace bundles	49.00
Mixed borings, turnings	23.00†
Shovel turnings	26.00-27.00
Machine shop turnings	23.00
Heavy turnings	31.00-35.00
Structurals & plates	49.00-51.00
Couplers, springs, wheels	51.00
Rail crops, 2 ft & under	66.00-68.00

Cast Iron Grades

No. 1 cupola	43.00
Heavy breakable cast	47.00
Drop broken machinery	54.00-55.00
Malleable	68.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	36.00-37.00
No. 2 bundles	20.00-21.00
Machine shop turnings	11.00-12.00
Mixed borings, turnings	14.00-15.00
Shovel turnings	15.00-16.00
Low phos. structurals & plates	39.00-40.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	37.00-38.00

Stainless Steel

18-8 sheets, clips, solids	200.00-205.00
18-8 borings, turnings	*90.00-95.00*
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	85.00-90.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.00
No. 2 heavy melting	25.50-26.50
No. 1 bundles	36.00-37.00
No. 1 busheling	36.00-37.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
No. 1 cast	39.00-40.00
Mixed cupola cast	36.00-36.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	31.00-32.00
No. 1 bundles	36.00-37.00
No. 2 bundles	25.00-26.00
No. 1 busheling	40.00-41.00
Cast iron borings	14.00-15.00
Machine shop turnings	*24.00-25.00*
Shovel turnings	25.00-26.00
Bar crops and plate	44.00-45.00
Structurals & plate	44.00-45.00
Electric furnace bundles	40.00-41.00
Electric furnace:	
3 ft and under	39.00-40.00
2 ft and under	38.00-39.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	42.00-43.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	57.00-58.00
Rails, rerolling	61.00-62.00
Rails, random lengths	53.00-54.00
Angles, splice bars	49.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	35.00-37.00
No. 2 heavy melting	33.00-34.00
No. 1 bundles	42.00
No. 2 bundles	26.00
No. 1 busheling	42.00
Machine shop turnings	19.00
Shovel turnings	21.00

Cast Iron Grades

No. 1 cupola	53.00
Charging box cast	46.00
Heavy breakable cast	44.00
Unstripped motor blocks	45.00
Clean auto cast	56.00
Stove plate	46.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00
Rails, 18 in. and under	54.00
Rails, random lengths	50.00
Rails, rerolling	61.00
Angles, splice bars	50.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	39.00
No. 2 heavy melting	36.00
No. 1 bundles	39.00
No. 2 bundles	25.00
Machine shop turnings	19.00-20.00
Shovel turnings	23.00
Low phos. plate & structurals	46.00-47.00†

Cast Iron Grades

No. 1 cupola	45.00-46.00†
Heavy breakable	33.00
Foundry malleable	41.00-42.00
Unstripped motor blocks	36.50-37.50

Railroad Scrap

No. 1 R.R. heavy melt.	39.00

LOS ANGELES

(Brokers' buying prices)

No. 1 heavy melting	40.00
No. 2 heavy melting	*35.00*
No. 1 bundles	*37.00*
No. 2 bundles	21.00
Machine shop turnings	18.00
Shovel turnings	18.00
Cast iron borings	18.00
Cut structurals and plate 1 ft and under	48.00

Cast Iron Grades

No. 1 cupola	47.00

Railroad Scrap

No. 1 R. R. heavy melt.	39.00

PORTLAND, OREG.

No. 1 heavy melting	38.00
No. 2 heavy melting	36.00
No. 1 bundles	36.00
No. 2 bundles	25.00
Shovel turnings	22.00
Electric furnace bundles	44.00-45.00

Cast Iron Grades

No. 1 cupola	40.00-42.00
Heavy breakable	35.00
Unstripped motor blocks	31.00
Stove plate	25.00

SEATTLE

No. 1 heavy melting	35.00†
No. 2 heavy melting	32.00
No. 1 bundles	32.00
No. 2 bundles	22.00†
Machine shop turnings	17.00†
Mixed borings, turnings	17.00†
Electric furnace No. 1	42.00-43.00

Cast Iron Grades

No. 1 cupola	34.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	26.00†
Stove plate (f.o.b. plant)	21.00†

SAN FRANCISCO

No. 1 heavy melting	40.00
No. 2 heavy melting	36.00
No. 1 bundles	36.00
No. 2 bundles	22.00
Machine shop turnings	16.00
Mixed borings, turnings	16.00
Cast iron borings	16.00
Heavy turnings	16.00
Shovel turnings	16.00
Cut structurals, 3 ft	44.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	32.25
No. 2 heavy melting	28.25
No. 1 bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Mixed borings, turnings	13.00
Busheling, new factory:	13.00
Prepared	32.25
Unprepared	26.25
Shovel turnings	17.00

Cast Iron Grades†

No. 1 machinery cast	46.50-48.00

*Delivered to docks.
†Nominal.
‡F.o.b. Hamilton, Ont.

"Sure it's a great idea but we were only using 26% of it!"

"We've had the Payroll Savings Plan for U.S. Savings Bonds in our outfit for years. We think it is good for the Country and good for our company—and it goes without saying it's good for the saver. I had assumed we had a large participation by our people. But when I checked up last month I found that only 26% of our employees were regular users of the plan. In a company our size there is always a certain amount of personnel turnover, and there are always some people who are going to subscribe . . . next payday, maybe.

"So what I did was contact our State Savings Bonds Director. He helped us put on a company-wide campaign that reached every employee personally to point out the advantages of buying new 3¾% Savings Bonds, *regularly*. Today we have more than 50% of our people using the plan, and we're going on from there!"

Perhaps *your* organization, too, has been taking your Payroll Savings Plan for granted. It's a great idea, but its value to your people and to your company increases with the number of employees who use it, *every payday*. Let your State Savings Bonds Director show you how easy it is to get your company back in the high value area of participation. Or write Savings Bonds Division, U.S. Treasury Department, Washington, D.C.

ALL U.S. SAVINGS BONDS—OLD OR NEW—EARN ½% MORE THAN BEFORE

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

Plenty of Aluminum Around

Even if business booms, there will be more than enough metal to satisfy your needs. New production, sales records to be set in 1960. Tellurium uses tripled last year

Nonferrous Metal Prices, Pages 138 & 139

IF YOU ARE a user of aluminum, here's good news: Availability this year will be the best in history. More than enough metal will be available to supply your needs, no matter how good business gets.

• **Potlines to Hum**—Primary producers are set to turn out a record number of tons for the third straight year (see graph). Look for big output to hit around 2.15 million tons compared with 1,953,019 tons in 1959.

Secondary recovery at primary plants and smelters should run between 500,000 and 530,000 tons compared with an estimated 455,000 tons last year.

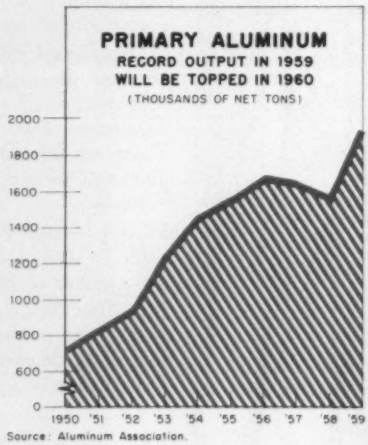
Pig and ingot imports dipped a little in 1959 to around 235,000 tons. Look for them to perk up this year with about 200,000 tons coming from Canada and 75,000 tons from other countries.

That means total domestic availability will be in the neighborhood of 2,925,000 to 2,955,000 tons. Add the increasing quantities of fabricated products being imported from Western Europe and Japan, which totaled about 54,000 tons last year.

• **Sour to Sweet**—So far, the soaring sixties have been a little sour for aluminum producers. That is partially due to the generally high level of metal stocks in consumers' plants (see STEEL's quarterly survey of inventories on Page 113).

• **Better Things Ahead**—Business should show a sharp improvement by the second quarter. Look for 1960 consumption to finally wind up 10 to 20 per cent ahead of last year's estimated 2.4 million tons. Marketmen justify such a bullish outlook by citing these forecasts: Auto uses will rise to 182,420 tons (based on a 6.5 million car year), up 40,500 tons from 1959. Use of aluminum in industrial construction and equipment up from 55,000 to 65,000 tons. Canmakers will take 25,000 tons, more than triple the amount they used in 1959.

• **Still More than Enough**—Even if 1960 consumption should match



Source: Aluminum Association.

the most bullish forecast—and climb by 20 per cent to 2,880,000 tons—there will be plenty of aluminum around. U. S. primary producers alone have a current capacity of 2,335,750 tons. That figure will rise to 2,426,750 by midyear and to 2.6 million tons by the end of 1961. In addition, the Canadian producer, Aluminum Co. of Canada, has 770,000 tons of capacity (presently operating at 87 per cent) and an additional 90,000 tons of partially completed capacity that could be brought in on short notice. The other Canadian producer, Canadian British Aluminium Ltd., has 90,000 tons of installed capacity.

• **Output to Creep Up**—Look for primary producers to put more idle capacity into operation as the year goes on. STEEL estimates the industry is now operating at an annual rate of 1,957,595 tons and will be operating at a rate of at least 2.1 million tons by June.

In the Markets

• **Zinc Gained Despite Strike**—Zinc consumption in 1959 hit 944,000 tons, a 75,000 ton jump over 1958, despite the steel strike which cost the industry about 80,000 tons of lost consumption.

Elsewhere in the zinc market, American Smelting & Refining Co. announced it was increasing the prices of zinc diecast alloy grades and high and special high grades by 0.25 cent a pound, effective Apr. 1. That eliminates the spread that has existed since Jan. 8.

• **Titanium Output Down**—Titanium sponge output in 1959 fell to 3900 tons from the 4585 ton figure registered in 1958, says the U. S. Bureau of Mines.

• **Tellurium Uses Triple**—Domestic shipments of tellurium, spurred by increased usage in thermoelectric refrigerating devices and in heat-to-electricity generators, soared to 350,000 lb last year compared with 137,000 lb in 1958.

NONFERROUS PRICE RECORD

	Jan. 27 Price	Last Change	Previous Price	Dec. Avg	Nov. Avg	Jan., 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	25.300	24.700	24.700
Copper	33.00–35.00	Dec. 23, 1959	33.00	33.269	32.420	29.212
Lead	11.80	Dec. 21, 1959	12.30	12.338	12.800	12.415
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	100.375	Jan. 27, 1960	100.50	99.130	100.985	99.409
Zinc	13.00	Jan. 8, 1960	12.50	12.500	12.500	11.500

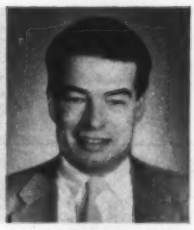
Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig 99.8%, Velasco, Tex.

Plan with your AIM*. . . Edgcomb Steel and Aluminum does . . .

Powered Machine aids effortless coil strapping

EDGCOMB STEEL AND ALUMINUM CORPORATION, HILLSIDE, N. J., and their Acme Idea Man developed a faster, easier way to handle and strap heavy coils of steel with the new Acme Steel F4 Strapping Machine and Indexing Table. (Idea No. S4-10)

Now Edgcomb Steel and Aluminum has doubled its coil strapping capacity and saves about eight man-hours per shift. Power lifts the coil above the indexing table top on three tapered rollers that rotate the coil for strap placement. The F4 tensions each strap to predetermined tightness, seals and cuts it. The F4 has unlimited strap feed and take-up, and makes its own seals from a coil.



Acme Idea Man, C. A. Lested, serves many companies with time and money-saving ideas.

Ask your Acme Idea Man to show you the new 10 minute movie on this equipment.

***Plan with your Acme Idea Man.** Backed by Acme Steel engineers, he can help adapt Acme Steel Strapping Machines to your needs. Call him or write: Dept. SDS-20, Acme Steel Products Division, Acme Steel Company, Chicago 27, Illinois. In Canada, Acme Steel Company of Canada, Limited, 743 Warden Ave., Toronto 13, Ontario.

ACME STEEL **STEEL STRAPPING**

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 30.70; No. 214, 31.50; No. 356, 28.60, 30 lb ingots; 10 lb ingots, add 0.4 cent per lb; 6 lb ingots, add 0.6 cent per lb.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.75 per lb for 500-lb keg, $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 35.00; lake, 33.00 deld.; fire refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 50 lb, $11 per lb, f.o.b. Minneapolis; 50-99 lb, $10; 100-499 lb, $9.50; 500 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $210-212 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $45-50 per troy oz.

Selenium: $7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom.; sheet, $55 per lb nom.

Tellurium: $3.00 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 100.375.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.50-4.25.

Zinc: Prime western, 13.00; brass special 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.25-14.50; special high grade, 14.50-14.75 deld. Diecasting alloy ingot No. 3, 16.50; No. 2, 17.00; No. 5, 16.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 27.25-29.00; No. 12 foundry alloy (No. 2 grade), 25.00-25.25; 5% silicon alloy, 0.60 Cu max., 26.25; 13 alloy, 0.60 Cu max., 26.25; 195 alloy, 28.00-28.75; 108 alloy, 25.50-25.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.50; grade 2, 24.25; grade 3, 23.25; grade 4, 22.75.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.50; No. 245, 36.00; high-leaded tin bronze, No. 305, 35.25; No. 1 yellow, No. 405, 24.75; manganese bronze, No. 421, 29.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.25-17.00; sheared mill plate, $5.25-10.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $4.00-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base, f.o.b. customer custody.

Thickness Range (in.)	Widths (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.00
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft lengths.

Diam. (in.)*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft. lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft. lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plate: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.75-26.25; No. 2 heavy copper and wire, 22.75-23.25; light copper, 21.25-21.75; No. 1 composition red brass, 18.50-18.75; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 33.00c)		
	Sheets, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	57.13b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	20.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 17.25-17.75; new brass clippings, 16.00-16.50; light brass, 12.25-12.50; heavy yellow brass, 13.25-13.75; new brass rod ends, 14.00-14.50; auto radiators, unsweated, 14.50-15.00; cocks and faucets, 15.50-16.00; brass pipe, 15.75-16.20.

Lead: Soft scrap lead, 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 7.25-7.75; mixed babbitt, 9.50-10.00.

Monel: Clippings, 28.00-29.00; old sheets, 24.00-26.00; turnings, 20.00-22.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 39.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 4.50-4.75; new diecast scrap, 4.00-4.25; old diecast scrap, 2.50-2.75.

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.50-15.00; mixed high copper clips, 12.50-13.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 12.75-13.25; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.75-17.25; segregrated high copper clips, 16.00-16.50; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.50-16.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.50-11.75; clean borings and turnings, 10.50-11.00; segregated low copper clips, 15.75-16.25; segregated high copper clips, 14.75-15.25; mixed low copper clips, 15.25-15.75; mixed high copper clips, 14.25-14.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 26.00; light copper, 24.00; refinery brass (60% copper) dry copper content, 24.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.50; No. 2 heavy copper and wire, 26.00; light copper, 24.00; No. 1 composition borings, 22.50; No. 1 composition solids, 23.00; heavy yellow brass solids, 16.75; yellow brass turnings, 15.50; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.

Copper: Flat-rolled, 50.04; oval, 48.00; 5000-10,000 lb; electrodeposited, 42.50; 2000-5000 lb lots; cast, 45.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 118.50; 200-499 lb, 117.00; 500-999 lb, 116.50; 1000 lb or more, 116.00.

Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.40 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.

Sodium Stannate: Less than 100 lb, 78.50; 100-600 lb, 69.20; 700-1900 lb, 66.40; 2000-9900 lb, 64.60; 10,000 lb or more, 63.30.

Stannous Chloride (Anhydrous): 25 lb, 153.80; 100 lb, 148.90; 400 lb, 146.50; 800-19,900 lb, 105.60; 20,000 lb or more, 99.50.

Stannous Sulphate: Less than 50 lb, 139.00; 50 lb, 109.00; 100-1900 lb, 107.00; 2000 lb or more, 105.00.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 133)

tonnage small. Export buying, however, has helped sustain the market—not only on the open hearth grades, but the other steel grades and cast iron as well.

• **New York**—Brokers' buying prices are unchanged on all the major grades, slack domestic demand being offset by continued good export movement of the open hearth grades. Prices on the cast grades are steady. Increased interest in stainless scrap is reflected in an advance on 18-8 borings and turnings.

• **Detroit**—The market is steady to strong. Auto lists involve tonnages estimated to be one-third larger than the January lists. Chrysler is reported offering 40,000 tons in bundles and busheling alone. Some supplementary bundles went at 50 cents above the current market.

• **Buffalo**—Cast scrap prices are off $2 a ton on a sizable purchase by a large foundry. It paid $48 for cupola cast. The price of machinery cast also dropped $2.

• **Cincinnati**—Prices on the leading steelmaking grades advanced $1 a ton on small sales last week. Most of the impetus came from anticipatory offerings by brokers. No. 1 heavy melting is quoted $37-$38, brokers' buying price.

While steel scrap is displaying new strength, weakness has developed in the cast iron grades, prices being off $1 to $2 a ton.

• **Birmingham**—Purchases of heavy tonnages of steelmaking grades of scrap last week by two steelmakers pushed prices up $1 a ton. That indicates underlying strength in the market generally. Machine shop turnings advanced $2, but prices on other grades held steady on small purchases. Users of cast iron scrap are out of the market and export demand is inactive.

• **Houston** — Prices are steady. Moderate consumer demand is matched by a restricted supply resulting from weather adverse to collections. The local mill expects no wide fluctuation in prices this month. It is expected to contract for a limited tonnage.

• **San Francisco** — Just enough scrap is moving into consumption to keep the price structure steady. No immediate change in the market situation is in prospect.

• **Seattle**—Little activity is reported in the market, only small tonnages moving. Larger buyers hold ample stocks, but it's thought high level steelmaking operations may stimulate demand for scrap tonnage this month. Exports from the Pudget Sound area are lacking at present.

Rails, Cars . . .

Track Material Prices, Page 126

Freight car orders spurted in December, totaling 10,560 units vs. 2624 in November, 1959, and 3706 in December, 1958, reports the American Railway Car Institute

CLASSIFIED

GET CASH NOW
for your new surplus motors, controls and transformers!
AVAILABLE: NEW MOTORS
Over 5,000 new motors in stock from ¼HP to 200HP. Special low prices
Write, wire or phone collect!
AJAX ELECTRIC MOTOR CORP.
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Long Distance Phone LD. 132

Help Wanted

PLANT SUPERINTENDENT for Structural Steel, Fabricating and Erection Company—20,000 ton capacity. To take complete charge of fabrication of structural steel for commercial, institutional and industrial buildings in Eastern States. Minimum requirements five years experience supervising shop employing approximately 100 personnel. Send complete resume, listing all employment, experience, education and salary requirements. Box No. 821, STEEL, Penton Bldg., Cleveland 13, Ohio.

CHIEF ENGINEER—Graduate engineer preferred, or other with comparable experience and background will be considered, to supervise engineering department engaged in all phases of design, manufacture, plant layout of foundry equipment, and installation of complete foundry automated molding lines of foundry equipment. Experience and proven background in machine design and foundry operation essential. Send complete resume to Box 827, STEEL, Penton Bldg., Cleveland 13, Ohio.

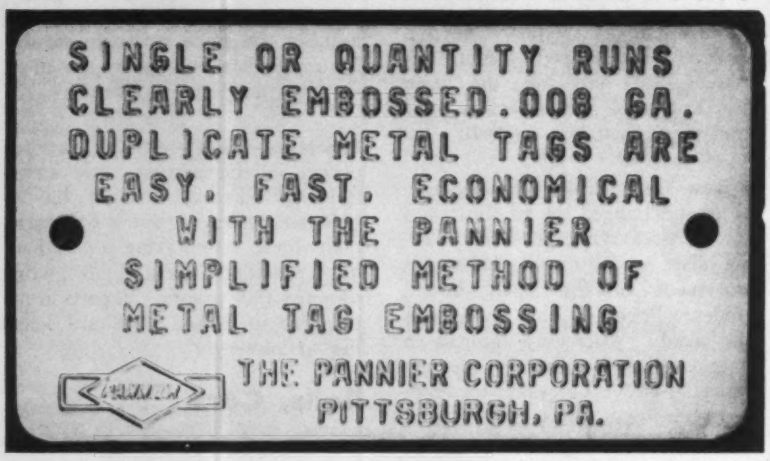
Positions Wanted

MECHANICAL ENGINEER, 45, graduate, 20 years tube mill plant and project engineering; including design, specifications, forward planning, and new construction. Desires responsibilities at departmental or corresponding administrative level. Reply Box 822, STEEL, Penton Bldg., Cleveland 13, Ohio.

CLASSIFIED RATES

All classifications other than "Position Wanted" set solid, 50 words or less $18.00, each additional word .36; all capitals, 50 words or less $21.00, each additional word .45; all capitals leaded, 50 words or less $25.00, each additional word .55. "Position Wanted" set solid, 25 words or less $5.00, each additional word. 20; all capitals, 25 words or less $6.50, each additional word. 26; all capitals leaded 25 words or less $8.00, each additional word .32. Keyed address takes seven words. Cash with order necessary on "Position Wanted" advertisements. Replies forwarded without charge. Displayed classified rates on request. Address your copy and instructions to STEEL, Penton Building, Cleveland 13, Ohio.

CUT YOUR METAL TAG COSTS...



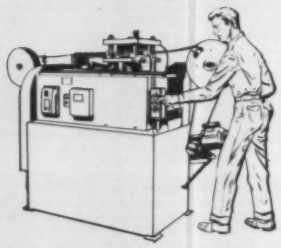
. . . Get clearer, sharper impressions, with PANNIER EMBOSSING MACHINES

Whether you use embossed metal tags in large, production quantities — or just a few, occasional tags — Pannier simplified embossing equipment is engineered to provide your metal tags at the lowest possible cost, greatest safety and easiest readability. Inexperienced help can operate any of the machines, large or small.

One to four tags at a time (model 344)

Model 344 Pannier Embossing Machine has two uses. It can emboss up to 4 duplicate tags, like that pictured above, in sizes up to 3" x 5½" or longer, at one operation (one letter at a time).

This same machine provides the low cost, matched male and female embossing matrices (shown at left) for use with Model 207. Paired, these two machines provide complete equipment for volume tag production.



Volume Tag Production (No. 207)

The Pannier Master Marker Embossing Machine, Model No. 207-H-6 automatically produces up to 60 duplicate tags per minute, employing coils of Pannier Safety Tag stock. These tags, in strip form, are nicked and notched for easy detachment from the coiled strip. Embossing impression is made by inexpensive male and female metal matrices—that cost only a fraction of type-and-matrix methods. The machine operates by start-stop pushbutton control. Fingers never approach the embossing area.

For single, occasional tags

Pannier engineering provides a wide range of Master Marker Embossing Machines to suit any quantity requirement. This small hand-held Embosser makes individual tags on half-inch strip metals or vinyl plastic.

Pannier Embossed Tags

You can order all your tag requirements from Pannier. They're embossed for you on these same machines. Tags are low cost and delivery service is fast. They can be made to your specifications, or write for standards and price list.

Write for literature or Pannier engineering service, specifying style and quantity of tags you require.

BIRTHMARKED MATERIALS

MARKING MASTER PANNIER MARKERS DEVICES

THE PANNIER CORPORATION

220 PANNIER BUILDING PITTSBURGH 12, PA.

Offices: Los Angeles • Cleveland • Chicago • Philadelphia • Birmingham

PANNIER MASTER MARKERS FOR QUALITY

and the Association of American Railroads. Total orders for all of 1959 were 56,494 cars compared with 17,414 in all of 1958.

Deliveries of domestic freight cars in December were 3032 vs. 2191 in the preceding month, and 2621 in December, 1958. For all of 1959, deliveries amounted to 37,819 units vs. 42,760 the preceding year.

Pig Iron . . .

Pig Iron Prices, Page 128

Merchant pig iron output is below capacity at many plants.

Domestic supplies are augmented by large imports. At Philadelphia alone, 31,150 tons of foreign iron arrived in December: 4200 tons of special analysis from Canada, 10,200 tons from Spain, 7500 tons from Holland, and 9250 tons from Durban, South Africa.

Blast Furnace Output in 1959 Tops That in 1958

Blast furnace production (pig iron and ferroalloys) in December totaled 7,638,359 net tons (65,728 ferromanganese and spiegeleisen), reports the American Iron & Steel Institute. It was the largest monthly output since May, 1959, when the total was 7,747,996 tons (64,237 tons of ferroalloys).

In November, output amounted to 4,219,273 tons (20,172 ferroalloys), and in December, 1958, it was 6,072,890 tons (47,505 ferroalloys).

Production for the year was 60,774,728 tons, including 452,312 tons of ferromanganese and spiegeleisen. That compares with 57,764,100 tons (465,456 ferroalloys) in 1958. Shipments for the year by states follow:

Blast Furnace Production
(Net tons)

States:	Total for Year 1959	1958
Massachusetts, New York	3,711,880	3,629,362
Pennsylvania	15,500,696	14,903,018
Maryland, Virginia, W. Virginia	5,771,916	5,937,590
Kentucky, Tennessee, Texas	1,451,166	1,581,312
Alabama	3,684,868	3,414,802
Ohio	11,693,985	9,662,386
Indiana	6,575,694	7,773,794
Illinois	5,268,443	4,200,136
Michigan, Minnesota	4,048,853	3,320,445
Colorado, Utah, California	3,067,237	3,341,255
Totals	60,774,738**	57,764,100***

**Includes 452,312 tons of ferromanganese and spiegeleisen.
***Includes 465,456 tons of ferromanganese and spiegeleisen.
Data from American Iron & Steel Institute.

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Somers THIN STRIP

®25,000:1 This fantastic ratio is possible only at Somers, where the latest equipment produces thin strip down to .001", as wide as 25".

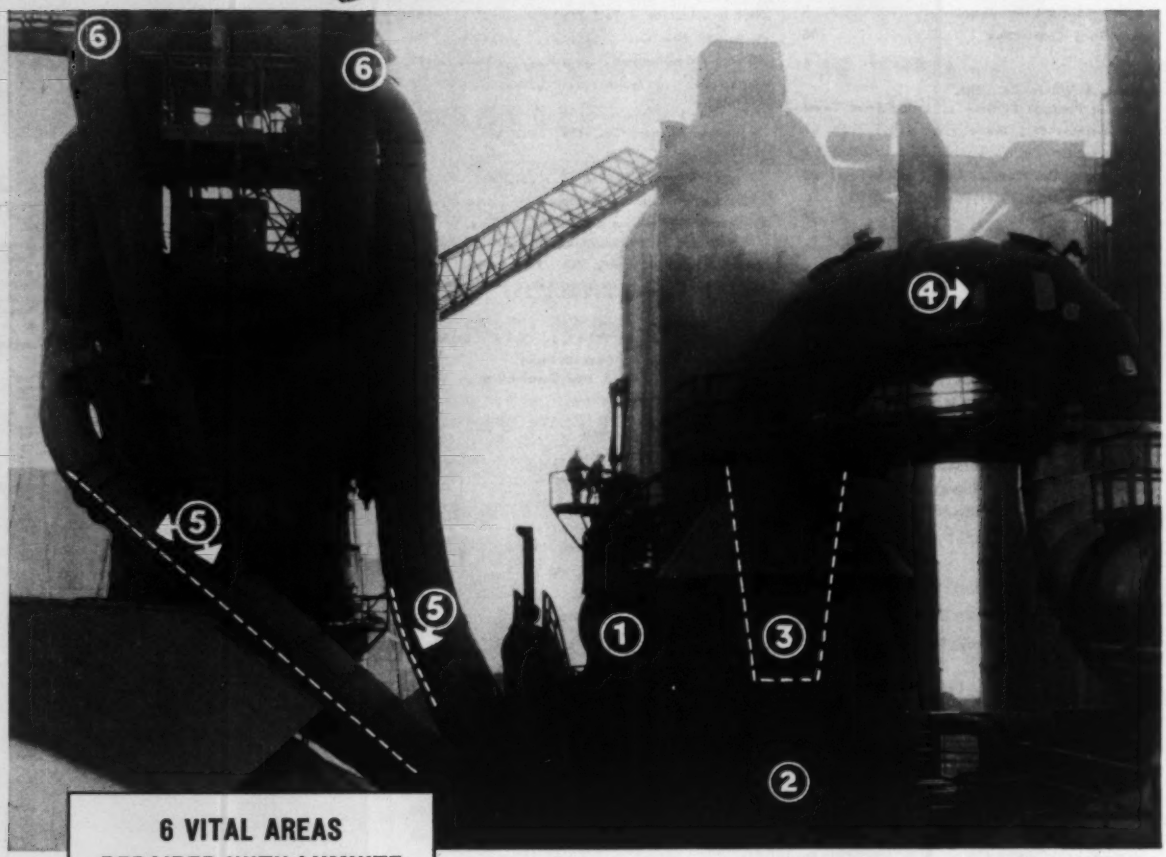
With the installation of one of the largest Sendzimir mills in the non-ferrous industry, Somers is prepared to meet the broadest range of dimensional specifications, since it is already supplying thin strip down to .0001" in narrower widths.

Pure Nickel, Monel, Inconel and Inconel "X" are produced in gauges from .0001" to .020". Stainless Steel, electrolytic Copper and its alloys, such as Brass, Nickel Silver and Phosphor Bronze from .0001" to .010".

For a complete survey of your strip problems at no cost or obligation, write for field engineer or Confidential Data Blank.

Somers Brass Company, Inc.
104 Baldwin Ave. Waterbury, Conn.

Industrial concretes protect blast furnace "hot spots"



6 VITAL AREAS REPAIRED WITH LUMNITE

gun-applied industrial concretes in blast furnace downcomers and dust separator, National Tube Div., U. S. Steel, McKeesport, Pa.

1. **Dust catcher,** spot repairs to brick lining.
2. **Dust separator** shell, complete lining.
3. **Inner cone,** complete lining.
4. **Elbows and piping,** lined for 65 lineal feet.
5. **Downcomers,** gunited for 120° arc in pipe bottom.
6. **Connections between uptakes and downcomers,** spot-repaired (two other connections gunited not shown).

For repairs or new installation, industrial concrete linings in blast furnace equipment solve many abrasion, erosion and heat problems. In addition, these monolithic concrete linings provide insulation. Made with LUMNITE calcium-aluminate cement and suitable aggregates, concrete linings are easy and economical to place – by guniting, casting or troweling. Unit downtime is reduced because concrete reaches service strength in 24 hours. For greater convenience, castables containing LUMNITE cement are available from leading manufacturers of refractories. These are packaged mixtures, ready to use by adding only water. For more information, write Universal Atlas Cement, 100 Park Avenue, New York 17, New York.

"USS," "Atlas" and "Lumnite" are registered trademarks.

L-199

Universal Atlas Cement
Division of
United States Steel

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Results

from pilot installation sell Youngstown Sheet and Tube complete 40-furnace Lee Wilson single stack annealing system

Two years ago Youngstown Sheet and Tube installed a pilot single stack annealing operation consisting of six furnaces and 18 bases. Today, after carefully compiling quality-economy comparison records, they have on order a complete Lee Wilson single stack annealing installation of 40 furnaces and 120 bases.

Outstanding results . . . that's what has made the Lee Wilson single stack furnace the most popular method of annealing wherever steel is made.

At Youngstown Sheet and Tube much of the comparison was made on 100 percent drawing quality steel where uniformity of anneal is an absolute necessity.

For uniformity and quality—for speed and flexibility—for economy under any operating condition—nothing beats the Lee Wilson single stack annealing furnace. That's why over 600 of them are in use today all over the world!

Lee Wilson ENGINEERING COMPANY, INC.

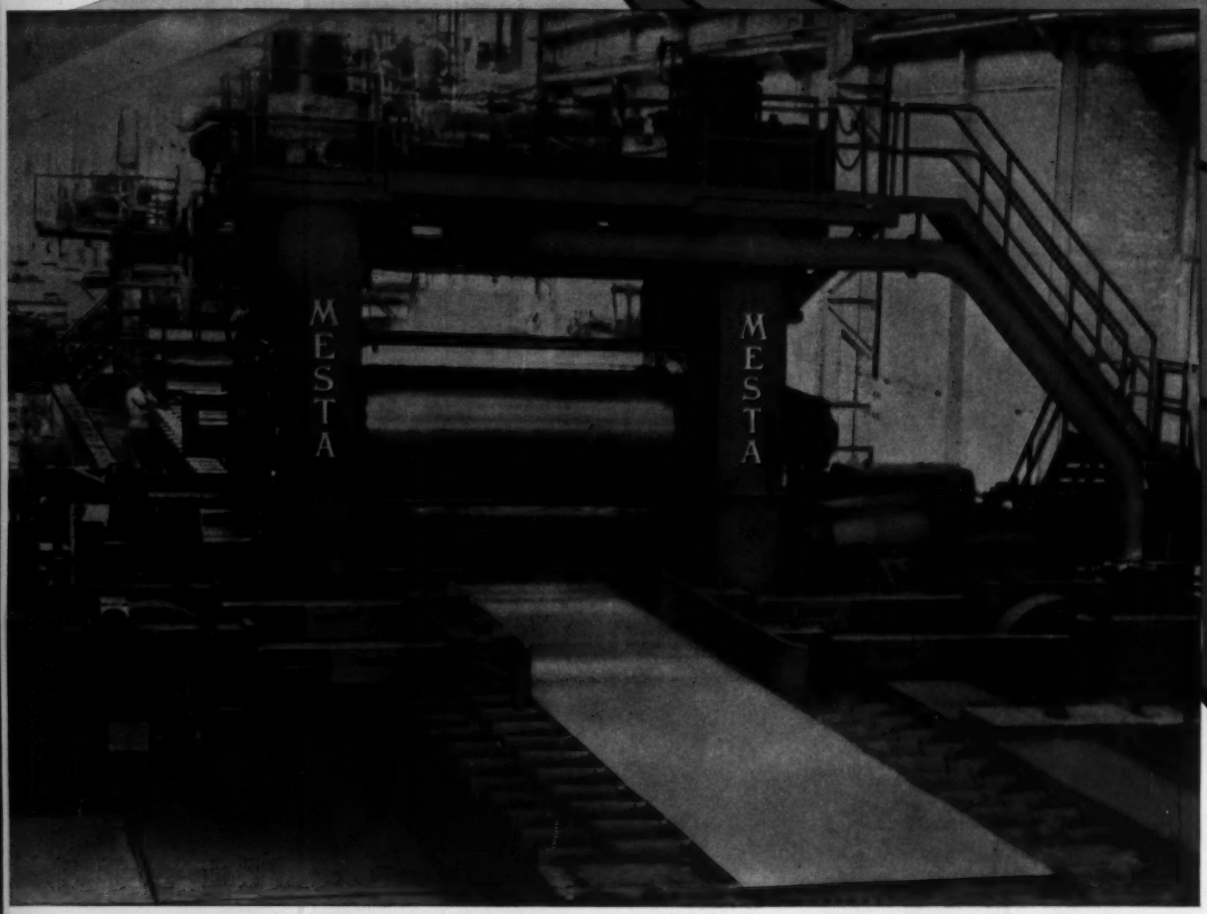
HIGH PRODUCTION ANNEALING SYSTEMS

MAKE THE BEST METALS BETTER

ORIGINATORS AND LEADING PRODUCERS OF OPEN-TOP COIL AND SINGLE STACK FURNACES

PLATE MILLS

Designed and Built by MESTA



MESTA 132" FOUR-HIGH REVERSING PLATE MILL

MESTA
THERE IS NONE BETTER

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA